

PROJECT MANUAL

WESTERN STATE HOSPITAL NEW KITCHEN COMMISSARY PHARMACY DSHS Project No. 2016-410G (2-1) Building 22, Patient Support Center

**Volume 1
Divisions 0-14**

**DEPARTMENT OF SOCIAL AND HEALTH SERVICES
Lakewood, Washington**

March 16, 2018



Project No. 121-16004

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Western State Hospital New Kitchen Commissary Pharmacy

DSHS/DES/Western State Hospital: APPROVALS SIGNATURE PAGE



Aaron Young, Assistant Program Manager, Department of Enterprise Services

11/20/2017

Date



Penny Koal, Project Manager, DSHS and DES

11/20/2017

Date



David Holt, Chief Operating Officer, Western State Hospital

11/20/2017

Date

2016-410G (2-1)

Western State Hospital New Kitchen Commissary Pharmacy

Thank you to the following Western State Hospital contributors to this project:

Chris Campbell, Deputy Chief Operating Officer

Joey Roberts, Logistics and Planning Manager

Nutrition and Food Services:

Michelle Gessner,
Director, Food & Nutrition Services

Pharmacy:

Katy Tomisser, Pharmacy Director
Mark Underwood, Pharmacy Asst Director
Billie-Jo Clary, Pyxis
Cynthia Fordham, Admin Assistant

Central Services:

Tammy Adams-Norman, CS Supervisor

Commissary:

Bob Mitchell, Warehouse Supervisor
Renate Jenkins, Warehouse Lead
Tim Feist, Dietary Warehouse Supervisor

Facilities, CMO, & Security

Tom Mark, Plant Manager
Kelly Cole, Transportation
Bartek Tarnowski, CMO Supervisor
Tony Whetstine, CMO Supervisor
Lee Owens, Environmental Services
John Wallace, Network Admin
Mike Davis, Network Admin
Michael Hull, IT/Telecom
Sean Murphy, Chief of Safety & Security
Nate Savage, Safety Operations Team

ADVERTISEMENT FOR BIDS

Sealed bids will be accepted for the following project:

PROJECT NO.: 2016-410 G (2-1)

TITLE: Western State Hospital - New Kitchen Commissary Pharmacy

AGENCY: E&AS for Department of Social and Health Services

PROJECT MANAGER: Penny Koal, AIA, LEED AP

ESTIMATED BASE BID COST RANGE: \$17,685,000.00 to \$18,185,000.00

SUBMITTAL TIME/DATE/LOCATION: Prior to 3:00 P.M., ~~Thursday~~ Wednesday (Addendum 3), February 21, 2018
Dept. of Enterprise Services
Engineering & Architectural Services
Mail to: PO Box 41476, Olympia, WA 98504-1476
Hand deliver to: Shipping & Receiving Room No. 1140, 1500 Jefferson Street SE, Olympia, WA 98501. Stop at lobby for directions.

Public Bid Opening will commence at approximately 3:05 P.M. at the same location.

BY: Department of Enterprise Services
Engineering & Architectural Services

PRE-BID WALK-THROUGH: Two pre-bid conferences will be conducted: Wednesday, January 24, 2018 at 2:00 P.M and Thursday, February 01, 2018 at 2:00 P.M. Meet at Facilities Maintenance Office in Building 1. For directions to the site of the pre-bid walk-through, please contact the Consultant listed below. **These will be the only opportunities for bidders to inspect the project site.**

Contractors may obtain plans and specifications from American Reprographics Company, 2730 Occidental Ave S, Seattle, WA 98134 upon the deposit of \$100.00 Please make checks payable to NAC Architecture. Plans must be returned in good condition within seven (7) days following bid date to obtain a refund of deposit. After seven days no refunds will be made.

Plans and specifications may be viewed at the following plan centers: Abadan Reprographics & Imaging, Spokane, WA; Associated Builders & Contractors, Spokane, WA; Associated General Contractors, Boise, ID; Builder's Exchange of Washington, Everett, WA; Daily Journal of Commerce

Plan Center, Portland, OR; Daily Journal of Commerce, Seattle, WA; Hermiston Plan Center, Hermiston, OR; Contractor Plan Center, Milwaukie, OR; Ridgeline Graphics (Wenatchee Plan Center), Wenatchee, WA; Spokane Regional Plan Center, Spokane, WA; Tri-City Construction Council, Kennewick, WA; Walla Walla Valley Plan Center, Walla Walla, WA; Weekly Construction Reporter, Bellingham, WA; Yakima Plan Center, Yakima, WA.

Please direct questions regarding this project to the office of the Consultant, NAC Architecture, 2025 First Avenue, Suite 300, Seattle, WA 98121, 206-441-4522. Within 24 hours following the bid opening, results will be available on E&A Services' web site at <https://fortress.wa.gov/ga/apps/EASbids/BidResult.aspx>.

The State of Washington prevailing wage rates are applicable for this public works project located in Pierce County. Bidders are responsible to verify and use the most recent prevailing wage rates. The "Effective Date" for this project is the Bid Form due date above. The applicable prevailing wage rates may be found on the Department of Labor & Industries website located at <https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx>.

Mandatory 15% apprentice labor hours of the total labor hours are a requirement of the construction contract. Voluntary workforce diversity goals for this apprentice participation are identified in the Instructions to Bidders and Supplemental Conditions. Bidders may contact the Department of Labor & Industries, Apprenticeship Section, to obtain information on available apprenticeship programs.

In accordance with RCW 39.30.060, the Bidder is required to provide the names of the Subcontractors with whom the Bidder will **directly** subcontract for the performance of heating, ventilation and air conditioning (HVAC), plumbing and electrical for this project.

Supplemental Bidder Responsibility will be evaluated for this project. In determining Bidder responsibility, the Owner shall consider an overall accounting of the criteria set forth in "DIVISION 00 SUPPLEMENTAL RESPONSIBILITY CRITERIA". Please direct questions regarding this subject to the office of the Consultant.

The successful Bidder is required to register and create an account in the DES Diversity Compliance program (B2Gnow) at <https://des.diversitycompliance.com>. Voluntary numerical Diverse Business goals of 10% MBE, 6% WBE, 5% Washington Small Business, and 5% Veterans have been established for this project. Achievement of the goals is encouraged.

Bidders may contact the Office of Minority and Women's Business Enterprise (OMWBE) at <http://OMWBE.wa.gov/> to obtain information on certified firms. Bidders may also utilize Washington Small Businesses registered in WEBS at <https://fortress.wa.gov/ga/webs/> and Veteran-owned Businesses at <http://www.dva.wa.gov/program/certified-veteran-and-servicemember-owned-businesses>.

The State reserves the right to accept or reject any or all bids and to waive informalities.

STATE OF WASHINGTON
DEPARTMENT OF ENTERPRISE SERVICES
ENGINEERING & ARCHITECTURAL SERVICES

2016410Gadvto

Instructions to Bidders – November 2017

General Conditions – July 2010

Supplemental Conditions – November 2017

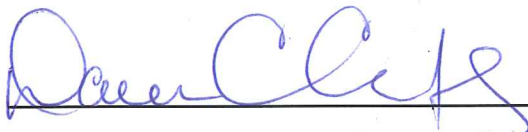
For Washington State Facility Construction

Effective: November 7, 2017

Approved by:



William J. Frare, Assistant Director
Facility Professional Services



Dawn Cortez, Assistant Attorney General
Washington State Office of the Attorney General



Facility Professional Services, Engineering & Architectural Services
PO Box 41476
Olympia, Washington 98504-1476
360.902.7272

INSTRUCTIONS TO BIDDERS
FOR WASHINGTON STATE FACILITIES CONSTRUCTION
November 7, 2017

PART 0 – GENERAL CONDITIONS

0.00 EXPLANATION TO PROSPECTIVE BIDDERS

- A. In accordance with RCW [39.04.380](#) effective *March 30, 2012*, the State of Washington is enforcing a **Reciprocal Preference for Resident Contractors**. Any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractor.

A nonresident contractor from a state that provides a percentage bid preference means a contractor that:

1. Is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts.
2. At the time of bidding on a public works project, does not have a physical office located in Washington.

The state of residence for a nonresident contractor is the state in which the contractor was incorporated or, if not a corporation, the state where the contractor's business entity was formed.

All nonresident contractors will be evaluated for out-of-state Bidder preference. If the state of the nonresident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.

This section does not apply to public works procured pursuant to RCW [39.04.155](#), [39.04.280](#), or any other procurement exempt from competitive bidding.

- B. Any prospective Bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Architect/Engineer (A/E) seven (7) calendar days before the bid due date. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective Bidder concerning a solicitation will be furnished promptly to all other prospective Bidders by addendum to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective Bidders.
- C. In accordance with the legislative findings and policies set forth in RCW [39.19](#) the State of Washington encourages participation in all of its contracts by MWBE firms certified by the Office of Minority and Women's Business Enterprises (OMWBE). Participation may be either on a direct basis in response to this invitation or as a subcontractor to a Bidder. However, unless required by federal statutes, regulations, grants, or contract terms referenced in the contract documents, no preference will be included in the evaluation of bids, no minimum level of MWBE participation shall be required as a condition for receiving an award, and bids will not be rejected or considered non-responsive on that basis. Any affirmative action requirements set forth in federal regulations or statutes included or referenced in the contract documents will apply.

- D. The State of Washington encourages participation in all of its contracts by Veteran-owned businesses (defined in RCW [43.60.010](#)) and located at <http://www.dva.wa.gov/program/certified-veteran-and-servicemember-owned-businesses> and Small, Mini and Micro businesses (defined in RCW [39.26.010](#)) which have registered in WEBS at <https://fortress.wa.gov/ga/webs/>
1. In order to report payment detail, the Contractor must create an account with the DES Diversity Compliance program (B2Gnow) or verify if an account has already been created on behalf of the Contractor: <https://des.diversitycompliance.com>. B2Gnow is designed to streamline and automate compliance reporting requirements, empowering vendors to maintain accurate contact information and submit contract payment details online.
 2. For account login or account creation details, please refer to the Quick Reference Guides located on pages 4 - 6 or go to B2Gnow home page by clicking on the URL listed above and clicking on the "Help/First Time Users" link.
 3. Every month for the duration of your contract, and while your contract is active in the B2Gnow system, submit and accurately maintain the following payment information through B2Gnow:
 - a. Payments received by the prime contractor from the Agency
 - b. Payments paid to each subcontractor
 - c. Payments paid to each supplier
- You must also ensure the following information is reported in the B2Gnow system by your subcontractors and lower-tier subcontractors for the duration of your contract:
- a. Confirmation of payments from the prime contractor to the subcontractor
 - b. Payment reporting to 2nd tier (and lower) subcontractors
- E. In accordance with RCW [39.04.320](#) the state of Washington requires 15% **Apprenticeship Participation** for all projects estimated to cost one million dollars or more. On applicable projects, the bid advertisement and Bid Form shall establish a minimum required percentage of apprentice labor hours compared to the total labor hours. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530, by phone (360) 902-5320, and e-mail at Apprentice@lni.wa.gov, to obtain information on available apprenticeship programs.

0.01 PREPARATION OF BIDS – CONSTRUCTION

- A. Bids must be: (1) submitted on the Bid Form, or copies of forms, furnished by the Owner or the Owner's agent, and (2) signed in ink. The person signing a bid must initial each change appearing on any Bid Form. If the bid is made by a corporation, it shall be signed by the corporation's authorized designee. The address of the Bidder shall be typed or printed on the Bid Form in the space provided.
- B. The Bid Form may require Bidders to submit bid prices for one or more items on various bases, including: (1) lump sum base bid; (2) lump sum bid alternate prices; (3) unit prices; or (4) any combination of items 1 through 3 above.
- C. If the solicitation includes alternate bid items, failure to bid on the alternates may disqualify the bid. If bidding on all items is not required, Bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.
- D. Substitute bid forms will not be considered unless this solicitation authorizes their submission.

0.02 BID GUARANTEE

- A. When the sum of the base bid plus all additive bid alternates is \$35,000.00 or less, bid security is not required.

When the sum of the base bid plus all additive alternates is greater than \$35,000.00, a bid guarantee in the amount of 5% of the base bid amount is required. Failure of the Bidder to provide bid guarantee when required shall render the bid non-responsive.

- B. Acceptable forms of bid guarantee are: A bid bond or postal money order, or certified check or cashier's check made payable to the Washington State Treasurer.

The Owner will return bid guarantees (other than bid bond) to unsuccessful Bidders as soon as practicable, but not sooner than the execution of a contract with the successful Bidder. The successful Bidder's bid guarantee will be returned to the successful Bidder with its official notice to proceed with the work of the contract.

- C. The Bidder will allow 60 days from bid opening date for acceptance of its bid by the Owner.

The Bidder will return to the Owner a signed contract, insurance certificate and bond or bond waiver within 15 days after receipt of the contract. If the apparent successful Bidder fails to sign all contractual documents or provide the bond and insurance as required or return the documents within 15 days after receipt of the contract, the Owner may terminate the award of the contract.

- D. In the event a Bidder discovers an error in its bid following the bid opening, the Bidder may request to withdraw its bid under the following conditions:

1. Written notification is received by the Owner within 24 hours following bid opening.
2. The Bidder provides written documentation of the claimed error to the satisfaction of the Owner within 72 hours following the bid opening.

The Owner will approve or disapprove the request for withdrawal of the bid in writing. If the Bidder's request for withdrawal of its bid is approved, the Bidder will be released from further obligation to the Owner without penalty. If it is disapproved, the Owner may retain the Bidder's bid guarantee.

0.03 ADDITIVE OR DEDUCTIVE BID ITEMS

The low Bidder, for purposes of award, shall be the responsive Bidder offering the low aggregate amount for the base bid item, plus additive or deductive bid alternates selected by the Owner, and within funds available for the project.

The Bidder agrees to hold all bid alternate prices for sixty (60) days from date of bid opening.

0.04 ACKNOWLEDGEMENT OF ADDENDA

Bidders shall acknowledge receipt of all addenda to this solicitation by identifying the addenda numbers in the space provided for this purpose on the Bid Form. Failure to do so may result in the bid being declared non-responsive.

0.05 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

The Bidder acknowledges that it has taken steps necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to; (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and road; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during the work. The Bidder also acknowledges that it has satisfied itself as to character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Bidder to take the actions described and acknowledged in this paragraph will not relieve the Bidder from responsibility for estimating properly the difficulty and cost of successfully performing the work.

0.06 BID AMOUNTS

- A. The bid prices shown for each item on the Bid Form shall include all labor, material, equipment, overhead and compensation to complete all of the work for that item.
- B. The actual cost of building permit (only) and the public utility hookup fees will be a direct reimbursement to the Contractor or paid directly to the permitting agency by the Owner. Fees for these permits should not be included by the Bidder in the bid amount.
- C. The Bidder agrees to hold the base bid prices for sixty (60) days from date of bid opening.

0.07 TAXES

The bid amounts shall not include Washington State Sales Tax (WSST). All other taxes imposed by law shall be included in the bid amount. The Owner will include WSST in progress payments. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.

[NOTE: Contractor must bond for contract amount plus the WSST.]

0.08 SUBMISSION OF BIDS

- A. Bids must be submitted on or before the time specified in the Advertisement for Bids.
- B. Subcontractor Listing: If the base bid and the sum of the additive alternates is one million dollars or more, the Bid Form shall comply with the following requirements:
 - 1. Pursuant to RCW [39.30.060](#), if the base bid and the sum of the additive alternates is one million dollars or more, the Bidder shall provide names of the Subcontractors with whom the Bidder will subcontract for performance of heating, ventilation and air conditioning (HVAC), plumbing, and electrical.
 - 2. The Bidder can name itself for the performance of the work.
 - 3. The Bidder shall not list more than one Subcontractor for each category of work identified UNLESS Subcontractors vary with bid alternates, in which case the Bidder must indicate which Subcontractor will be used for which alternate.

4. Failure of the Bidder to submit as part of the bid the NAMES of such Subcontractors or to name itself to perform such work shall render the Bidder's bid nonresponsive and, therefore, void.
- C. The Bid Form shall be submitted in a sealed envelope addressed to the office specified in the Advertisement for Bids. The envelope shall have printed on the outside:
1. The project number and description.
 2. The name and address of the Bidder.
 3. Identification as Bid Form.
- D. Prior to the bid opening, the Owner's representative will designate the official bid clock. Any part of the Bid Form, or in the rare situation of a bid modification, not received prior to the times specified, per the designated bid clock, will not be considered and the bid will be returned to the Bidder unopened.
- E. A bid may be withdrawn in person by a Bidder's authorized representative before the opening of the bids. Bidder(s) representative will be required to show ID and sign on bid summary sheet before it will be released.
- F. People with disabilities who wish to request special accommodation, (e.g., sign language interpreters, braille, etc.) need to contact the Owner ten (10) working days prior to the scheduled bid opening.

0.09 BID RESULTS

After the Bid Opening, Bidders may obtain bid results from the office of E&AS by calling (360) 902-7272 or by logging on to E&AS' web site: <https://fortress.wa.gov/ga/apps/EASbids/BidResult.aspx>. Bid results may also be obtained from the A/E.

0.10 LOW RESPONSIBLE BIDDER

- A. **Mandatory Responsibility Criteria:** Before award of a public works contract, a Bidder must meet the following mandatory responsibility criteria under RCW [39.04.350 \(1\) & \(2\)](#) to be considered a responsible Bidder and qualified to be awarded a public works project. The Bidder must:
1. At the time of bid submittal, have a certificate of registration in compliance with RCW [18.27](#);
 2. Have a current state unified business identifier number;
 3. If applicable, have industrial insurance coverage for the Bidder's employees working in Washington as required in RCW [51](#); an employment security department number as required in RCW [50](#); and a state excise tax registration number as required in RCW [82](#);
 4. Not be disqualified from bidding on any public works contract under RCW [39.06.010](#) or [39.12.065\(3\)](#);
 5. If bidding on a public works project subject to the apprenticeship utilization requirements in RCW [39.04.320](#), not have been found out of compliance by the Washington State Apprenticeship and Training Council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under RCW [49.04](#) for the one-year period immediately preceding the date of the bid solicitation; and

6. Within the three year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgement entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW [49.48.082](#), any provision of RCW [49.46](#), [49.48](#), or [49.52](#). A bidder shall submit a signed Contractor Certification form with the bid form regarding this wage theft prevention responsible bidder criteria.
- B. Supplemental Responsibility Criteria:** In addition to the mandatory Bidder responsibility, the Owner may adopt relevant supplemental criteria for determining Bidder responsibility applicable to a particular project which the Bidder must meet (RCW [39.04.350](#) (3)).
1. If applicable, the Owner shall consider an overall accounting of the attached supplemental criteria for determining Bidder responsibility "DIVISION 00 SUPPLEMENTAL RESPONSIBILITY CRITERIA".
 2. At least seven (7) days prior to the bid submittal deadline, a potential Bidder may request that the Owner modify the supplemental responsibility criteria. The Owner will evaluate the information submitted by the potential Bidder and respond before the bid submittal deadline. If the evaluation results in a change of the criteria, the Owner will issue an addendum to the bidding documents identifying the new criteria.
 3. Upon Owner's request, the apparent low Bidder must supply the requested responsibility information within two (2) business days of request by Owner. Withholding information or failure to submit all the information requested within the time provided may render the bid non-responsive
 4. If the Owner determines that the apparent low Bidder is not responsible, the Owner will notify the Bidder of its preliminary determination in writing.
 5. Within three (3) days after receipt of the preliminary determination, the Bidder may withdraw its bid or request a hearing where the Bidder may appeal the preliminary determination and present additional information to the Owner.
 6. The Owner will schedule a hearing within three (3) working days of receipt of the Bidder's request. The hearing members will include a Client Agency Representative, EAS Assistant Director or designee, Deputy Assistant Director or designee, and Project Manager.
 7. The Owner will issue a Final Determination after reviewing information presented at the hearing.
 8. If the Owner determines a Bidder to be not responsible, the Owner will provide, in writing, the reasons for the determination. If the final determination affirms that the Bidder is not responsible, the Owner will not execute a contract with any other Bidder until two (2) business days after the Bidder determined to be not responsible has received the final determination.
 9. The Owner's Final Determination is specific to this project, and will have no effect on other or future projects.

0.11 CONTRACT AWARD

- A. The Owner will evaluate bids responsiveness and responsibility.
 1. A bid will be considered responsive if it meets the following requirements:

- a. It is received at the proper time and place.
 - b. It meets the stated requirements of the Bid Form.
 - c. It is submitted by a licensed/registered contractor within the state of Washington at the time of bid opening and is not banned from bidding by the Department of Labor and Industries.
 - d. It is accompanied by a bid guarantee, if required.
 - e. It is accompanied by a signed and completed "Contractor Certification Wage Theft Prevention – Responsible Bidder Criteria" of the bid form.
2. A bid will be considered responsible if it meets the following requirements:
- a. It meets the mandatory responsibility criteria established in RCW [39.04.350](#) and an overall accounting of the supplemental responsibility criteria established for the project.
- B. The Owner reserves the right to accept or reject any or all bids and to waive informalities.
- C. The Owner may negotiate bid price adjustments with the low responsive Bidder, including changes in the contract documents, to bring the bid within the available funding per RCW [39.04.015](#).
- D. The apparent low Bidder, for purpose of award, shall be the responsive and responsible Bidder offering the low aggregate amount for the base bid plus selected additive or deductive bid alternates and meeting all other bid submittal requirements.
- E. **Reciprocal Preference for Resident Contractors.** For a public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a Comparable Percentage Disadvantage (CPD) will be applied to the bid of that nonresident contractor. The CPD is the in-state contractor percent advantage provided by the contractor's home state.

For the purpose of determining the successful Bidder, multiply the Nonresident Contractor bid amount by the CPD. The "bid amount" shall be the total of the base bid and all accepted alternate bid items. The CPD shall be added to the Nonresident Contractor bid amount which equates to the Nonresident Disadvantage Total. The Nonresident Disadvantage Total shall be compared to the Washington contractor bid amounts. The Bidder with the lowest total shall be the successful Bidder. See example below:

EXAMPLE:

Alaska Nonresident Contractor Bid Amount	\$100,000
<u>Multiplied by the Alaska CPD</u>	<u>x 0.05</u>
Alaska CPD Total	\$ 5,000
Alaska Nonresident Contractor Bid Amount	\$100,000
<u>Alaska CPD Total</u>	<u>\$ 5,000</u>
Nonresident Disadvantage Total	\$105,000*

* Note – If the Nonresident Disadvantage Total is lower than all other Washington contractor bid amounts, the Alaska Nonresident Contractor is the successful Bidder and will be awarded a contract for the bid amount of \$100,000.

If the Nonresident Disadvantage Total is higher than a Washington contractor bid amount, the successful Washington Bidder will be awarded a contract for the bid amount.

- F. The Contract will only become effective when signed by the Owner. Prior to the Owner's signature, any and all costs incurred shall be the sole responsibility of the Bidder.

0.12 DOCUMENTS (ATTACHED)

- A. Advertisement for Bids
- B. Bid Form
- C. Supplemental Bidder Responsibility Criteria (if applicable)
- D. Certificate of Insurance form
- E. Special Conditions (if applicable)

Note: AIA Payment Bond and Performance Bond current forms (A312) are required, when applicable. These forms will not be provided by the Owner.

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PART 1 – GENERAL PROVISIONS

1.01 DEFINITIONS

- A. “Application for Payment” means a written request submitted by Contractor to A/E for payment of Work completed in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Owner or A/E may require.
- B. “Architect,” “Engineer,” or “A/E” means a person or entity lawfully entitled to practice architecture or engineering, representing Owner within the limits of its delegated authority.
- C. “Change Order” means a written instrument signed by Owner and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any, and (3) the extent of the adjustment in the Contract Time, if any.
- D. “Claim” means Contractor’s exclusive remedy for resolving disputes with Owner regarding the terms of a Change Order or a request for equitable adjustment, as more fully set forth in Part 8.
- E. “Contract Award Amount” is the sum of the Base Bid and any accepted Alternates.
- F. “Contract Documents” means the Advertisement for Bids, Instructions for Bidders, completed Bid Form, General Conditions, Modifications to the General Conditions, Supplemental Conditions, Public Works Contract, other Special Forms, Drawings and Specifications, and all addenda and modifications thereof.
- G. “Contract Sum” is the total amount payable by Owner to Contractor, for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the Work, except Washington State sales tax.
- H. “Contract Time” is the number of calendar days allotted in the Contract Documents for achieving Substantial Completion of the Work.
- I. “Contractor” means the person or entity who has agreed with Owner to perform the Work in accordance with the Contract Documents.
- J. “Day(s)”: Unless otherwise specified, day(s) shall mean calendar day(s).”
- K. “Drawings” are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.
- L. “Final Acceptance” means the written acceptance issued to Contractor by Owner after Contractor has completed the requirements of the Contract Documents, as more fully set forth in Section 6.09 B.
- M. “Final Completion” means that the Work is fully and finally complete in accordance with the Contract Documents, as more fully set forth in Section 6.09 A.
- N. “Force Majeure” means those acts entitling Contractor to request an equitable adjustment in the Contract Time, as more fully set forth in paragraph 3.05A.
- O. “Notice” means a written notice which has been delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended or, if delivered or sent by registered or certified mail, to the last business address known to the party giving notice.

- P. "Notice to Proceed" means a notice from Owner to Contractor that defines the date on which the Contract Time begins to run.
- Q. "Owner" means the state agency, institution, or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.
- R. "Person" means a corporation, partnership, business association of any kind, trust, company, or individual.
- S. "Prior Occupancy" means Owner's use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.08 A.
- T. "Progress Schedule" means a schedule of the Work, in a form satisfactory to Owner, as further set forth in Section 3.02.
- U. "Project" means the total construction of which the Work performed in accordance with the Contract Documents may be the whole or a part and which may include construction by Owner or by separate contractors.
- V. "Project Record" means the separate set of Drawings and Specifications as further set forth in paragraph 4.02A.
- W. "Schedule of Values" means a written breakdown allocating the total Contract Sum to each principal category of Work, in such detail as requested by Owner.
- X. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.
- Y. "Subcontract" means a contract entered into by Subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind for or in connection with the Work.
- Z. "Subcontractor" means any person, other than Contractor, who agrees to furnish or furnishes any supplies, materials, equipment, or services of any kind in connection with the Work.
- AA. "Substantial Completion" means that stage in the progress of the Work when the construction is sufficiently complete, as more fully set forth in Section 6.07.
- AB. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

1.02 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents shall be resolved by giving the documents precedence in the following order:

1. Signed Public Works Contract, including any Change Orders.
2. Supplemental Conditions.
3. Modifications to the General Conditions.
4. General Conditions.

5. Specifications. Provisions in Division 1 shall take precedence over provisions of any other Division.
6. Drawings. In case of conflict within the Drawings, large scale drawings shall take precedence over small scale drawings.
7. Signed and Completed Bid Form.
8. Instructions to Bidders.
9. Advertisement for Bids.

1.03 EXECUTION AND INTENT

Contractor Representations: Contractor makes the following representations to Owner:

1. Contract Sum reasonable: The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;
2. Contractor familiar with project: Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof;
3. Contractor financially capable: Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor's obligations required by the Contract Documents; and
4. Contractor can complete Work: Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

PART 2 – INSURANCE AND BONDS

2.01 CONTRACTOR'S LIABILITY INSURANCE

General insurance requirements: Prior to commencement of the Work, Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Owner that such insurance has been procured. Review of the Contractor's insurance by Owner shall not relieve or decrease the liability of Contractor. Companies writing the insurance to be obtained by this part shall be licensed to do business under Chapter 48 RCW or comply with the Surplus Lines Law of the State of Washington. Contractor shall include in its bid the cost of all insurance and bond costs required to complete the base bid work and accepted alternates. Insurance carriers providing insurance in accordance with the Contract Documents shall be acceptable to Owner, and its A.M. Best rating shall be indicated on the insurance certificates.

- A. Term of insurance coverage: Contractor shall maintain the following insurance coverage during the Work and for one year after Final Acceptance. Contractor shall also maintain the following insurance coverage during the performance of any corrective Work required by Section 5.16.

1. General Liability Insurance: Commercial General Liability (CGL) on an Occurrence Form. Coverage shall include, but not be limited to:
 - a. Completed operations/products liability;
 - b. Explosion, collapse, and underground; and
 - c. Employer's liability coverage.
 2. Automobile Liability Insurance: Automobile liability
- B. Industrial Insurance compliance: Contractor shall comply with the Washington State Industrial Insurance Act and, if applicable, the Federal Longshoremen's and Harbor Workers' Act and the Jones Act.
- C. Insurance to protect for the following: All insurance coverages shall protect against claims for damages for personal and bodily injury or death, as well as claims for property damage, which may arise from operations in connection with the Work whether such operations are by Contractor or any Subcontractor.
- D. Owner as Additional Insured: All insurance coverages shall be endorsed to include Owner as an additional named insured for Work performed in accordance with the Contract Documents, and all insurance certificates shall evidence the Owner as an additional insured.

2.02 COVERAGE LIMITS

Insurance amounts: The coverage limits shall be as follows:

- A. Limits of Liability shall not be less than \$1,000,000 Combined Single Limit for Bodily Injury and Property Damage (other than Automobile Liability) Each Occurrence; Personal Injury and Advertising Liability Each Occurrence.
- B. \$2,000,000 Combined Single Limit Annual General Aggregate.
- C. \$2,000,000 Annual Aggregate for Products and Completed Operations Liability.
- D. \$1,000,000 Combined Single Limit for Automobile Bodily Injury and Property Damage Liability, Each Accident or Loss.

2.03 INSURANCE COVERAGE CERTIFICATES

- A. Certificate required: Prior to commencement of the Work, Contractor shall furnish to Owner a completed certificate of insurance coverage.
- B. List Project info: All insurance certificates shall name Owner's Project number and Project title.
- C. Cancellation provisions: All insurance certificates shall specifically require 45 Days prior notice to Owner of cancellation or any material change, except 30 Days for surplus line insurance.

2.04 PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, plus state sales tax, shall be furnished for the Work, using the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. Prior to execution of a Change Order that, cumulatively with previous Change Orders, increases the Contract Award Amount by 15% or more, the Contractor shall provide either new payment and performance bonds for the

revised Contract Sum, or riders to the existing payment and performance bonds increasing the amount of the bonds. The Contractor shall likewise provide additional bonds or riders when subsequent Change Orders increase the Contract Sum by 15% or more. No payment or performance bond is required if the Contract Sum is \$35,000 or less and Contractor agrees that Owner may, in lieu of the bond, retain 50% of the Contract Sum for the period allowed by RCW 39.08.010.

2.05 ALTERNATIVE SURETY

When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety as required to protect Owner and persons supplying labor or materials required by the Contract Documents if:

- A. Owner has a reasonable objection to the surety; or
- B. Any surety fails to furnish reports on its financial condition if required by Owner.

2.06 BUILDER'S RISK

- A. Contractor to buy Property Insurance: Contractor shall purchase and maintain property insurance in the amount of the Contract Sum including all Change Orders for the Work on a replacement cost basis until Substantial Completion. For projects not involving New Building Construction, "Installation Floater" is an acceptable substitute for the Builder's Risk Insurance. The insurance shall cover the interest of Owner, Contractor, and any Subcontractors, as their interests may appear.
- B. Losses covered: Contractor property insurance shall be placed on an "all risk" basis and insure against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, temporary buildings, debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for A/E's services and expenses required as a result of an insured loss.
- C. Waiver of subrogation rights: Owner and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/E's subconsultants, separate contractors described in Section 5.20, if any, and any of their subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this section or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Owner as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

PART 3 – TIME AND SCHEDULE

3.01 PROGRESS AND COMPLETION

Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within a reasonable period thereafter.

3.02 CONSTRUCTION SCHEDULE

- A. Preliminary Progress Schedule: Unless otherwise provided in Division 1, Contractor shall, within 14 Days after issuance of the Notice to Proceed, submit a preliminary Progress Schedule. The Progress Schedule shall show the sequence in which Contractor proposes to perform the Work,

and the dates on which Contractor plans to start and finish major portions of the Work, including dates for shop drawings and other submittals, and for acquiring materials and equipment.

- B. Form of Progress Schedule: Unless otherwise provided in Division 1, the Progress Schedule shall be in the form of a bar chart, or a critical path method analysis, as specified by Owner. The preliminary Progress Schedule may be general, showing the major portions of the Work, with a more detailed Progress Schedule submitted as directed by Owner.
- C. Owner comments on Progress Schedule: Owner shall return comments on the preliminary Progress Schedule to Contractor within 14 Days of receipt. Review by Owner of Contractor's schedule does not constitute an approval or acceptance of Contractor's construction means, methods, or sequencing, or its ability to complete the Work within the Contract Time. Contractor shall revise and resubmit its schedule, as necessary. Owner may withhold a portion of progress payments until a Progress Schedule has been submitted which meets the requirements of this section.
- D. Monthly updates and compliance with Progress Schedule: Contractor shall utilize and comply with the Progress Schedule. On a monthly basis, or as otherwise directed by Owner, Contractor shall submit an updated Progress Schedule at its own expense to Owner indicating actual progress. If, in the opinion of Owner, Contractor is not in conformance with the Progress Schedule for reasons other than acts of Force Majeure as identified in Section 3.05, Contractor shall take such steps as are necessary to bring the actual completion dates of its work activities into conformance with the Progress Schedule, and if directed by Owner, Contractor shall submit a corrective action plan or revise the Progress Schedule to reconcile with the actual progress of the Work.
- E. Contractor to notify Owner of delays: Contractor shall promptly notify Owner in writing of any actual or anticipated event which is delaying or could delay achievement of any milestone or performance of any critical path activity of the Work. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.03 OWNER'S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE

- A. Owner may suspend Work: Owner may, at its sole discretion, order Contractor, in writing, to suspend all or any part of the Work for up to 90 Days, or for such longer period as mutually agreed.
- B. Compliance with suspension; Owner's options: Upon receipt of a written notice suspending the Work, Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of cost of performance directly attributable to such suspension. Within a period up to 90 Days after the notice is delivered to Contractor, or within any extension of that period to which the parties shall have agreed, Owner shall either:
 - 1. Cancel the written notice suspending the Work; or
 - 2. Terminate the Work covered by the notice as provided in the termination provisions of Part 9.
- C. Resumption of Work: If a written notice suspending the Work is cancelled or the period of the notice or any extension thereof expires, Contractor shall resume Work.
- D. Equitable Adjustment for suspensions: Contractor shall be entitled to an equitable adjustment in the Contract Time, or Contract Sum, or both, for increases in the time or cost of performance

directly attributable to such suspension, provided Contractor complies with all requirements set forth in Part 7.

3.04 OWNER'S RIGHT TO STOP THE WORK FOR CAUSE

- A. Owner may stop Work for Contractor's failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Owner may order Contractor, in writing, to stop the Work, or any portion thereof, until satisfactory corrective action has been taken.
- B. No Equitable Adjustment for Contractor's failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor's failure or refusal to perform or from any reasonable remedial action taken by Owner based upon such failure.

3.05 DELAY

- A. Force Majeure actions not a default; Force Majeure defined: Any delay in or failure of performance by Owner or Contractor, other than the payment of money, shall not constitute a default hereunder if and to the extent the cause for such delay or failure of performance was unforeseeable and beyond the control of the party ("Force Majeure"). Acts of Force Majeure include, but are not limited to:
1. Acts of God or the public enemy;
 2. Acts or omissions of any government entity;
 3. Fire or other casualty for which Contractor is not responsible;
 4. Quarantine or epidemic;
 5. Strike or defensive lockout;
 6. Unusually severe weather conditions which could not have been reasonably anticipated; and
 7. Unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Owner was available.
- B. Contract Time adjustment for Force Majeure: Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it makes a request for equitable adjustment according to Section 7.03. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.
- C. Contract Time or Contract Sum adjustment if Owner at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in Contract Sum, if the cost or time of Contractor's performance is changed due to the fault or negligence of Owner, provided the Contractor makes a request according to Sections 7.02 and 7.03.
- D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

- E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, provided it makes a request for equitable adjustment according to Section 7.03, but shall not be entitled to an adjustment in Contract Sum.
- F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise.

3.06 NOTICE TO OWNER OF LABOR DISPUTES

- A. Contractor to notify Owner of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Owner.
- B. Pass through notification provisions to Subcontractors: Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages

1. Reason for Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.
2. Calculation of Liquidated Damages amount: The liquidated damage amounts set forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from periodic payments to the Contractor.
3. Contractor responsible even if Liquidated Damages assessed: Assessment of liquidated damages shall not release Contractor from any further obligations or liabilities pursuant to the Contract Documents.

B. Actual Damages

Calculation of Actual Damages: Actual damages will be assessed for failure to achieve Final Completion within the time provided. Actual damages will be calculated on the basis of direct architectural, administrative, and other related costs attributable to the Project from the date when Final Completion should have been achieved, based on the date Substantial Completion is actually achieved, to the date Final Completion is actually achieved. Owner may offset these costs against any payment due Contractor.

PART 4 – SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW

- A. Specifications and Drawings are basis of the Work: The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.
- B. Parts of the Contract Documents are complementary: The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.
- C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Owner. If, during the performance of the Work, Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to A/E in writing.
- D. Contractor knowledge of discrepancy in documents – responsibility: Contractor shall do no Work without applicable Drawings, Specifications, or written modifications, or Shop Drawings where required, unless instructed to do so in writing by Owner. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.
- E. Contractor to perform Work implied by Contract Documents: Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.
- F. Interpretation questions referred to A/E: Questions regarding interpretation of the requirements of the Contract Documents shall be referred to the A/E.

4.02 PROJECT RECORD

- A. Contractor to maintain Project Record Drawings and Specifications: Contractor shall legibly mark in ink on a separate set of the Drawings and Specifications all actual construction, including depths of foundations, horizontal and vertical locations of internal and underground utilities and appurtenances referenced to permanent visible and accessible surface improvements, field changes of dimensions and details, actual suppliers, manufacturers and trade names, models of installed equipment, and Change Order Proposals (COP). This separate set of Drawings and Specifications shall be the "Project Record."
- B. Update Project Record weekly and keep on site: The Project Record shall be maintained on the project site throughout the construction and shall be clearly labeled "PROJECT RECORD." The Project Record shall be updated at least weekly noting all changes and shall be available to Owner at all times.
- C. Final Project Record to A/E before Final Acceptance: Contractor shall submit the completed and finalized Project Record to A/E prior to Final Acceptance.

4.03 SHOP DRAWINGS

- A. Definition of Shop Drawings: "Shop Drawings" means documents and other information required to be submitted to A/E by Contractor pursuant to the Contract Documents, showing in detail: the proposed fabrication and assembly of structural elements; and the installation (i.e. form, fit, and attachment details) of materials and equipment. Shop Drawings include, but are not limited to, drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed, Contractor shall submit all samples at its own expense. Owner may duplicate, use, and disclose Shop Drawings provided in accordance with the Contract Documents.
- B. Approval of Shop Drawings by Contractor and A/E: Contractor shall coordinate all Shop Drawings, and review them for accuracy, completeness, and compliance with the Contract Documents and shall indicate its approval thereon as evidence of such coordination and review. Where required by law, Shop Drawings shall be stamped by an appropriate professional licensed by the state of Washington. Shop Drawings submitted to A/E without evidence of Contractor's approval shall be returned for resubmission. Contractor shall review, approve, and submit Shop Drawings with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or separate contractors. Contractor's submittal schedule shall allow a reasonable time for A/E review. A/E will review, approve, or take other appropriate action on the Shop Drawings. Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed and the A/E has approved or taken other appropriate action. Owner and A/E shall respond to Shop Drawing submittals with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed Shop Drawings. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.
- C. Contractor not relieved of responsibility when Shop Drawings approved: Approval, or other appropriate action with regard to Shop Drawings, by Owner or A/E shall not relieve Contractor of responsibility for any errors or omissions in such Shop Drawings, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Owner or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor's means or methods of construction. If Contractor fails to obtain approval before installation and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.
- D. Variations between Shop Drawings and Contract Documents: If Shop Drawings show variations from the requirements of the Contract Documents, Contractor shall describe such variations in writing, separate from the Shop Drawings, at the time it submits the Shop Drawings containing such variations. If A/E approves any such variation, an appropriate Change Order will be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be recorded upon the Project Record.
- E. Contractor to submit 5 copies of Shop Drawings: Unless otherwise provided in Division 1, Contractor shall submit to A/E for approval 5 copies of all Shop Drawings. Unless otherwise indicated, 3 sets of all Shop Drawings shall be retained by A/E and 2 sets shall be returned to Contractor.

4.04 ORGANIZATION OF SPECIFICATIONS

Specification organization by trade: Specifications are prepared in sections which conform generally with trade practices. These sections are for Owner and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS

- A. A/E, not Contractor, owns Copyright of Drawings and Specifications: The Drawings, Specifications, and other documents prepared by A/E are instruments of A/E's service through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, and A/E shall be deemed the author of them and will, along with any rights of Owner, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor's set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.
- B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner and A/E. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E appropriate to and for use in the execution of their Work.
- C. Shop Drawing license granted to Owner: Contractor and all Subcontractors grant a non-exclusive license to Owner, without additional cost or royalty, to use for its own purposes (including reproduction) all Shop Drawings, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing Shop Drawings, Contractor and all Subcontractors warrant that they have authority to grant to Owner a license to use the Shop Drawings, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Owner pursuant to the indemnity provisions in Section 5.03 and 5.22 from any violations of copyright or other intellectual property rights arising out of Owner's use of the Shop Drawings hereunder, or to secure for Owner, at Contractor's own cost, licenses in conformity with this section.
- D. Shop Drawings to be used only for this Project: The Shop Drawings and other submittals prepared by Contractor, Subcontractors of any tier, or its or their equipment or material suppliers, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor of any tier, or material or equipment supplier, on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner. The Contractor, Subcontractors of any tier, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Shop Drawings and other submittals appropriate to and for use in the execution of their Work under the Contract Documents.

PART 5 – PERFORMANCE

5.01 CONTRACTOR CONTROL AND SUPERVISION

- A. Contractor responsible for Means and Methods of construction: Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the Work in a skillful manner. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, unless the

Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner.

- B. Competent Superintendent required: Performance of the Work shall be directly supervised by a competent superintendent who has authority to act for Contractor. The superintendent must be satisfactory to the Owner and shall not be changed without the prior written consent of Owner. Owner may require Contractor to remove the superintendent from the Work or Project site, if Owner reasonably deems the superintendent incompetent, careless, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition.
- C. Contractor responsible for acts and omissions of self and agents: Contractor shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.
- D. Contractor to employ competent and disciplined workforce: Contractor shall enforce strict discipline and good order among all of the Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor's employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons. Owner may, by written notice, request Contractor to remove from the Work or Project site any employee Owner reasonably deems incompetent, careless, or otherwise objectionable.
- E. Contractor to keep project documents on site: Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed Shop Drawings, and permits and permit drawings.
- F. Contractor to comply with ethical standards: Contractor shall ensure that its owner(s) and employees, and those of its Subcontractors, comply with the Ethics in Public Service Act RCW 42.52, which, among other things, prohibits state employees from having an economic interest in any public works contract that was made by, or supervised by, that employee. Contractor shall remove, at its sole cost and expense, any of its, or its Subcontractors' employees, if they are in violation of this act.

5.02 PERMITS, FEES, AND NOTICES

- A. Contractor to obtain and pay for permits: Unless otherwise provided in the Contract Documents, Contractor shall pay for and obtain all permits, licenses, and inspections necessary for proper execution and completion of the Work. Prior to Final Acceptance, the approved, signed permits shall be delivered to Owner.
- B. Allowances for permit fees: If allowances for permits or utility fees are called for in the Contract Documents and set forth in Contractor's bid, and the actual costs of those permits or fees differ from the allowances in the Contract Documents, the difference shall be adjusted by Change Order.
- C. Contractor to comply with all applicable laws: Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

5.03 PATENTS AND ROYALTIES

Payment, indemnification, and notice: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Owner harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a

particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it shall promptly notify Owner of such potential infringement.

5.04 PREVAILING WAGES

- A. Contractor to pay Prevailing Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate.
- B. Statement of Intent to Pay Prevailing Wages: Before payment is made by the Owner to the Contractor for any work performed by the Contractor and subcontractors whose work is included in the application for payment, the Contractor shall submit, or shall have previously submitted to the Owner for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the Department of Labor and Industries, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.
- C. Affidavit of Wages Paid: Prior to release of retainage, the Contractor shall submit to the Owner an Affidavit of Wages Paid, approved by the Department of Labor and Industries, for the Contractor and every subcontractor, of any tier, that performed work on the Project.
- D. Disputes: Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of the Department of Labor and Industries. The arbitration decision shall be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.
- E. Statement with pay application; Post Statements of Intent at job site: Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the prefiled statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.
- F. Contractor to pay for Statements of Intent and Affidavits: In compliance with chapter 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.
- G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any subcontractor shall submit a certified copy of payroll records if requested.

5.05 HOURS OF LABOR

- A. Overtime: Contractor shall comply with all applicable provisions of RCW 49.28 and they are incorporated herein by reference. Pursuant to that statute, no laborer, worker, or mechanic employed by Contractor, any Subcontractor, or any other person performing or contracting to do the whole or any part of the Work, shall be permitted or required to work more than eight hours in any one calendar day, provided, that in cases of extraordinary emergency, such as danger to life or property, the hours of work may be extended, but in such cases the rate of pay for time employed in excess of eight hours of each calendar day shall be not less than one and one-half times the rate allowed for this same amount of time during eight hours of service.

- B. 4-10 Agreements: Notwithstanding the preceding paragraph, RCW 49.28 permits a contractor or subcontractor in any public works contract subject to those provisions, to enter into an agreement with its employees in which the employees work up to ten hours in a calendar day. No such agreement may provide that the employees work ten-hour days for more than four calendar days a week. Any such agreement is subject to approval by the employees. The overtime provisions of RCW 49.28 shall not apply to the hours, up to forty hours per week, worked pursuant to any such agreement.

5.06 NONDISCRIMINATION

- A. Discrimination prohibited by applicable laws: Discrimination in all phases of employment is prohibited by, among other laws and regulations, Title VII of the Civil Rights Act of 1964, the Vietnam Era Veterans Readjustment Act of 1974, Sections 503 and 504 of the Vocational Rehabilitation Act of 1973, the Equal Employment Act of 1972, the Age Discrimination Act of 1967, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, Presidential Executive Order 11246, Executive Order 11375, the Washington State Law Against Discrimination, RCW 49.60, and Gubernatorial Executive Order 85-09. These laws and regulations establish minimum requirements for affirmative action and fair employment practices which Contractor must meet.

- B. During performance of the Work:

1. Protected Classes: Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, or disabled veteran status, nor commit any other unfair practices as defined in RCW 49.60.
2. Advertisements to state nondiscrimination: Contractor shall, in all solicitations or advertisements for employees placed by or for it, state that all qualified applicants will be considered for employment, without regard to race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability.
3. Contractor to notify unions and others of nondiscrimination: Contractor shall send to each labor union, employment agency, or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union, employment agency, or workers' representative of Contractor's obligations according to the Contract Documents and RCW 49.60.
4. Owner and State access to Contractor records: Contractor shall permit access to its books, records, and accounts, and to its premises by Owner, and by the Washington State Human Rights Commission, for the purpose of investigation to ascertain compliance with this section of the Contract Documents.
5. Pass through provisions to Subcontractors: Contractor shall include the provisions of this section in every Subcontract.

5.07 SAFETY PRECAUTIONS

- A. Contractor responsible for safety: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work.
- B. Contractor safety responsibilities: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations,

and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

- C. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.
- D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.
1. Information. At a minimum, Contractor shall inform persons working on the Project site of:
 - a. WAC: The requirements of chapter 296-62 WAC, General Occupational Health Standards;
 - b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and
 - c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC.
 2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:
 - a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
 - b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area;
 - c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
 - d. Hazard communications program: The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.
- E. Hazardous, toxic or harmful substances: Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:
1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or

harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as "hazardous substances"), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 Days on the Project site.

2. Contractor notifications of spills, failures, inspections, and fines: Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.
- F. Public safety and traffic: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor's responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.
- G. Contractor to act in an emergency: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.
- H. No duty of safety by Owner or A/E: Nothing provided in this section shall be construed as imposing any duty upon Owner or A/E with regard to, or as constituting any express or implied assumption of control or responsibility over, Project site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

5.08 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

- A. Limited storage areas: Contractor shall confine all operations, including storage of materials, to Owner-approved areas.
- B. Temporary buildings and utilities at Contractor expense: Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Owner and without expense to Owner. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.
- C. Roads and vehicle loads: Contractor shall use only established roadways or temporary roadways authorized by Owner. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation.
- D. Ownership and reporting by Contractor of demolished materials: Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Owner with a copy of all manifests and receipts evidencing proper disposal when required by Owner or applicable law.
- E. Contractor responsible for care of materials and equipment on-site: Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to approval of

Owner. When Contractor uses any portion of the Project site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

- F. Contractor responsible for loss of materials and equipment: Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Substantial Completion, and shall repair or replace without cost to Owner any damage or loss that may occur, except damages or loss caused by the acts or omissions of Owner. Contractor shall also protect and be responsible for any damage or loss to the Work, or to the materials or equipment, after the date of Substantial Completion, and shall repair or replace without cost to Owner any such damage or loss that might occur, to the extent such damages or loss are caused by the acts or omissions of Contractor, or any Subcontractor.

5.09 PRIOR NOTICE OF EXCAVATION

- A. Excavation defined; Use of locator services: "Excavation" means an operation in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means, except the tilling of soil less than 12 inches in depth for agricultural purposes, or road ditch maintenance that does not change the original road grade or ditch flow line. Before commencing any excavation, Contractor shall provide notice of the scheduled commencement of excavation to all owners of underground facilities or utilities, through locator services.

5.10 UNFORESEEN PHYSICAL CONDITIONS

- A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than 7 Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.
- B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 7.

5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES AND IMPROVEMENTS

- A. Contractor to protect and repair property: Contractor shall protect from damage all existing structures, equipment, improvements, utilities, and vegetation: at or near the Project site; and on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor.
- B. Tree and vegetation protection: Contractor shall only remove trees when specifically authorized to do so, and shall protect vegetation that will remain in place.

5.12 LAYOUT OF WORK

- A. Advanced planning of the Work: Contractor shall plan and lay out the Work in advance of operations so as to coordinate all work without delay or revision.

- B. Layout responsibilities: Contractor shall lay out the Work from Owner-established baselines and bench marks indicated on the Drawings, and shall be responsible for all field measurements in connection with the layout. Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the Work. Contractor shall be responsible for executing the Work to the lines and grades that may be established. Contractor shall be responsible for maintaining or restoring all stakes and other marks established.

5.13 MATERIAL AND EQUIPMENT

- A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of A/E, is equal to that named in the specifications, unless otherwise specifically provided in the Contract Documents.
- B. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonably implied by, the Contract Documents. Contractor shall not endanger any work by cutting, excavating, or otherwise altering the Work and shall not cut or alter the work of any other contractor unless approved in advance by Owner.
- C. Owner may reject defective Work: Should any of the Work be found defective, or in any way not in accordance with the Contract Documents, this work, in whatever stage of completion, may be rejected by Owner.

5.14 AVAILABILITY AND USE OF UTILITY SERVICES

- A. Owner to provide and charge for utilities: Owner shall make all reasonable utilities available to Contractor from existing outlets and supplies, as specified in the Contract Documents. Unless otherwise provided in the Contract Documents, the utility service consumed shall be charged to or paid for by Contractor at prevailing rates charged to Owner or, where the utility is produced by Owner, at reasonable rates determined by Owner. Contractor will carefully conserve any utilities furnished.
- B. Contractor to install temporary connections and meters: Contractor shall, at its expense and in a skillful manner satisfactory to Owner, install and maintain all necessary temporary connections and distribution lines, together with appropriate protective devices, and all meters required to measure the amount of each utility used for the purpose of determining charges. Prior to the date of Final Acceptance, Contractor shall remove all temporary connections, distribution lines, meters, and associated equipment and materials.

5.15 TESTS AND INSPECTION

- A. Contractor to provide for all testing and inspection of Work: Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. Contractor shall give Owner timely notice of when and

where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Owner.

- B. Owner may conduct tests and inspections: Owner may, at any reasonable time, conduct such inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Owner shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Owner, such Owner inspection and tests are for the sole benefit of Owner and do not:
1. Constitute or imply acceptance;
 2. Relieve Contractor of responsibility for providing adequate quality control measures;
 3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;
 4. Relieve Contractor of its responsibility to comply with the requirements of the Contract Documents; or
 5. Impair Owner's right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.
- C. Inspections or inspectors do not modify Contract Documents: Neither observations by an inspector retained by Owner, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.
- D. Contractor responsibilities on inspections: Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Owner. Owner may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. Owner shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.16 CORRECTION OF NONCONFORMING WORK

- A. Work covered by Contractor without inspection: If a portion of the Work is covered contrary to the requirements in the Contract Documents, it must, if required in writing by Owner, be uncovered for Owner's observation and be replaced at the Contractor's expense and without change in the Contract Time.
- B. Payment provisions for uncovering covered Work: If, at any time prior to Final Completion, Owner desires to examine the Work, or any portion of it, which has been covered, Owner may request to see such Work and it shall be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and, if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes such a request as provided in Part 7. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.
- C. Contractor to correct and pay for non-conforming Work: Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or

completed. Contractor shall bear all costs of correcting such nonconforming Work, including additional testing and inspections.

- D. Contractor's compliance with warranty provisions: If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or within one year after the date for commencement of any system warranties established under Section 6.08, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written notice from Owner to do so. Owner shall give such notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor's duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or replacement. Obligations under this paragraph shall survive Final Acceptance.
- E. Contractor to remove non-conforming Work: Contractor shall remove from the Project site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Owner.
- F. Owner may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.
- G. Contractor to pay for damaged Work during correction: Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.
- H. No Period of limitation on other requirements: Nothing contained in this section shall be construed to establish a period of limitation with respect to other obligations which Contractor might have according to the Contract Documents. Establishment of the time period of one year as described in Section 5.16D relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced.
- I. Owner may accept non-conforming Work and charge Contractor: If Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, Owner may do so instead of requiring its removal and correction, in which case the Contract Sum may be reduced as appropriate and equitable.

5.17 CLEAN UP

Contractor to keep site clean and leave it clean: Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Contractor.

5.18 ACCESS TO WORK

Owner and A/E access to Work site: Contractor shall provide Owner and A/E access to the Work in progress wherever located.

5.19 OTHER CONTRACTS

Owner may award other contracts; Contractor to cooperate: Owner may undertake or award other contracts for additional work at or near the Project site. Contractor shall reasonably cooperate with the other contractors and with Owner's employees and shall carefully adapt scheduling and perform the Work in accordance with these Contract Documents to reasonably accommodate the other work.

5.20 SUBCONTRACTORS AND SUPPLIERS

- A. Subcontractor Responsibility: The Contractor shall include the language of this paragraph in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this paragraph apply to all subcontractors regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:
1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
 2. Have a current Washington Unified Business Identifier (UBI) number;
 3. If applicable, have:
 - a. Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;
 - b. A Washington Employment Security Department number, as required in Title 50 RCW;
 - c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
 - d. An electrical contractor license, if required by Chapter 19.28 RCW;
 - e. An elevator contractor license, if required by Chapter 70.87 RCW.
 4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3).
 5. On a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of the Owner's first advertisement of the project.
- B. Provide names of Subcontractors and use qualified firms: Before submitting the first Application for Payment, Contractor shall furnish in writing to Owner the names, addresses, and telephone numbers of all Subcontractors, as well as suppliers providing materials in excess of \$2,500. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom the Owner has a reasonable objection, and shall obtain Owner's written consent before making any substitutions or additions.

- C. Subcontracts in writing and pass through provision: All Subcontracts must be in writing. By appropriate written agreement, Contractor shall require each Subcontractor, so far as applicable to the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.
- D. Coordination of Subcontractors; Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.
- E. Automatic assignment of subcontracts: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Owner provided that:
1. Effective only after termination and Owner approval: The assignment is effective only after termination by Owner for cause pursuant to Section 9.01 and only for those Subcontracts which Owner accepts by notifying the Subcontractor in writing; and
 2. Owner assumes Contractor's responsibilities: After the assignment is effective, Owner will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract.
 3. Impact of bond: The assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

5.21 WARRANTY OF CONSTRUCTION

- A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.
- B. Contractor responsibilities: With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract Documents, Contractor shall:
1. Obtain warranties: Obtain all warranties that would be given in normal commercial practice;
 2. Warranties for benefit of Owner: Require all warranties to be executed, in writing, for the benefit of Owner;
 3. Enforcement of warranties: Enforce all warranties for the benefit of Owner, if directed by Owner; and
 4. Contractor responsibility for subcontractor warranties: Be responsible to enforce any subcontractor's, manufacturer's, or supplier's warranties should they extend beyond the period specified in the Contract Documents.
- C. Warranties beyond Final Acceptance: The obligations under this section shall survive Final Acceptance.

5.22 INDEMNIFICATION

- A. Contractor to indemnify Owner: Contractor shall defend, indemnify, and hold Owner and A/E harmless from and against all claims, demands, losses, damages, or costs, including but not limited to damages arising out of bodily injury or death to persons and damage to property, caused by or resulting from:
1. Sole negligence of Contractor: The sole negligence of Contractor or any of its Subcontractors;
 2. Concurrent negligence: The concurrent negligence of Contractor, or any Subcontractor, but only to the extent of the negligence of Contractor or such Subcontractor; and
 3. Patent infringement: The use of any design, process, or equipment which constitutes an infringement of any United States patent presently issued, or violates any other proprietary interest, including copyright, trademark, and trade secret.
- B. Employee action and RCW Title 51: In any action against Owner and any other entity indemnified in accordance with this section, by any employee of Contractor, its Subcontractors, Sub-subcontractors, agents, or anyone directly or indirectly employed by any of them, the indemnification obligation of this section shall not be limited by a limit on the amount or type of damages, compensation, or benefits payable by or for Contractor or any Subcontractor under RCW Title 51, the Industrial Insurance Act, or any other employee benefit acts. In addition, Contractor waives immunity as to Owner and A/E only, in accordance with RCW Title 51.

PART 6 – PAYMENTS AND COMPLETION

6.01 CONTRACT SUM

Owner shall pay Contract Sum: Owner shall pay Contractor the Contract Sum plus state sales tax for performance of the Work, in accordance with the Contract Documents.

6.02 SCHEDULE OF VALUES

Contractor to submit Schedule of Values: Before submitting its first Application for Payment, Contractor shall submit to Owner for approval a breakdown allocating the total Contract Sum to each principal category of work, in such detail as requested by Owner (“Schedule of Values”). The approved Schedule of Values shall include appropriate amounts for demobilization, record drawings, O&M manuals, and any other requirements for Project closeout, and shall be used by Owner as the basis for progress payments. Payment for Work shall be made only for and in accordance with those items included in the Schedule of Values.

6.03 APPLICATION FOR PAYMENT

- A. Monthly Application for Payment with substantiation: At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an itemized Application for Payment for Work completed in accordance with the Contract Documents and the approved Schedule of Values. Each application shall be supported by such substantiating data as Owner may require.
- B. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.011, as their interests appeared in the last preceding certificate of payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.03, are true and correct, to the best of Contractor’s knowledge, as of the date of the Application for Payment.

- C. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Owner, the actual progress of the Work with the Progress Schedule.
- D. Payment for material delivered to site or stored off-site: If authorized by Owner, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:
1. Suitable facility or location: The material will be placed in a facility or location that is structurally sound, dry, lighted and suitable for the materials to be stored;
 2. Facility or location within 10 miles of Project: The facility or location is located within a 10-mile radius of the Project. Other locations may be utilized, if approved in writing, by Owner;
 3. Facility or location exclusive to Project's materials: Only materials for the Project are stored within the facility or location (or a secure portion of a facility or location set aside for the Project);
 4. Insurance provided on materials in facility or location: Contractor furnishes Owner a certificate of insurance extending Contractor's insurance coverage for damage, fire, and theft to cover the full value of all materials stored, or in transit;
 5. Facility or location locked and secure: The facility or location (or secure portion thereof) is continuously under lock and key, and only Contractor's authorized personnel shall have access;
 6. Owner right of access to facility or location: Owner shall at all times have the right of access in company of Contractor;
 7. Contractor assumes total responsibility for stored materials: Contractor and its surety assume total responsibility for the stored materials; and
 8. Contractor provides documentation and Notice when materials moved to site: Contractor furnishes to Owner certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Owner when materials are moved from storage to the Project site.

6.04 PROGRESS PAYMENTS

- A. Owner to pay within 30 Days: Owner shall make progress payments, in such amounts as Owner determines are properly due, within 30 Days after receipt of a properly executed Application for Payment. Owner shall notify Contractor in accordance with chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.
- B. Withholding retainage; Options for retainage: Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including, at Owner's request, consent of surety to release of the retainage. In accordance with chapter 60.28 RCW, Contractor may request that monies reserved be retained in a fund by Owner, deposited by Owner in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Owner may permit Contractor to provide an appropriate bond in lieu of the retained funds.

- C. Title passes to Owner upon payment: Title to all Work and materials covered by a progress payment shall pass to Owner at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Owner to insist on full compliance by Contractor with the Contract Documents.
- D. Interest on unpaid balances: Payments due and unpaid in accordance with the Contract Documents shall bear interest as specified in chapter 39.76 RCW.

6.05 PAYMENTS WITHHELD

- A. Owner's right to withhold payment: Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Owner from loss or damage for reasons including but not limited to:
1. Non-compliant Work: Work not in accordance with the Contract Documents;
 2. Remaining Work to cost more than unpaid balance: Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum;
 3. Owner correction or completion Work: Work by Owner to correct defective Work or complete the Work in accordance with Section 5.16;
 4. Contractor's failure to perform: Contractor's failure to perform in accordance with the Contract Documents; or
 5. Contractor's negligent acts or omissions: Cost or liability that may occur to Owner as the result of Contractor's fault or negligent acts or omissions.
- B. Owner to notify Contractor of withholding for unsatisfactory performance: In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Owner shall notify Contractor in accordance with chapter 39.76 RCW.

6.06 RETAINAGE AND BOND CLAIM RIGHTS

Chapters 39.08 RCW and 60.28 RCW incorporated by reference: Chapters 39.08 RCW and 60.28 RCW, concerning the rights and responsibilities of Contractor and Owner with regard to the performance and payment bonds and retainage, are made a part of the Contract Documents by reference as though fully set forth herein.

6.07 SUBSTANTIAL COMPLETION

Substantial Completion defined: Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so Owner has full and unrestricted use and benefit of the facilities (or portion thereof designated and approved by Owner) for the use for which it is intended. All Work other than incidental corrective or punch list work shall be completed. Substantial Completion shall not have been achieved if all systems and parts are not functional, if utilities are not connected and operating normally, if all required occupancy permits have not been issued, or if the Work is not accessible by normal vehicular and pedestrian traffic routes. The date Substantial Completion is achieved shall be established in writing by Owner. Contractor may request an early date of Substantial Completion which must be approved by Change Order. Owner's occupancy of the Work or designated portion thereof does not necessarily indicate that Substantial Completion has been achieved.

6.08 PRIOR OCCUPANCY

- A. Prior Occupancy defined; Restrictions: Owner may, upon written notice thereof to Contractor, take possession of or use any completed or partially completed portion of the Work ("Prior Occupancy") at any time prior to Substantial Completion. Unless otherwise agreed in writing, Prior Occupancy shall not: be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Owner provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.
- B. Damage; Duty to repair and warranties: Notwithstanding anything in the preceding paragraph, Owner shall be responsible for loss of or damage to the Work resulting from Prior Occupancy. Contractor's one year duty to repair any system warranties shall begin on building systems activated and used by Owner as agreed in writing by Owner and Contractor.

6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

- A. Final Completion defined: Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved shall be established by Owner in writing, but in no case shall constitute Final Acceptance which is a subsequent, separate, and distinct action.
- B. Final Acceptance defined: Final Acceptance shall be achieved when the Contractor has completed the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Owner in writing. Prior to Final Acceptance, Contractor shall, in addition to all other requirements in the Contract Documents, submit to Owner a written notice of any outstanding disputes or claims between Contractor and any of its Subcontractors, including the amounts and other details thereof. Neither Final Acceptance, nor final payment, shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Owner arising from Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Final payment waives Claim rights: Acceptance of final payment by Contractor, or any Subcontractor, shall constitute a waiver and release to Owner of all claims by Contractor, or any such Subcontractor, for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Part 8.

PART 7 – CHANGES

7.01 CHANGE IN THE WORK

- A. Changes in Work, Contract Sum, and Contract Time by Change Order: Owner may, at any time and without notice to Contractor's surety, order additions, deletions, revisions, or other changes in the Work. These changes in the Work shall be incorporated into the Contract Documents through the execution of Change Orders. If any change in the Work ordered by Owner causes an increase or decrease in the Contract Sum or the Contract Time, an equitable adjustment shall be made as provided in Section 7.02 or 7.03, respectively, and such adjustment(s) shall be incorporated into a Change Order.
- B. Owner may request COP from Contractor: If Owner desires to order a change in the Work, it may request a written Change Order Proposal (COP) from Contractor. Contractor shall submit a Change Order Proposal within 14 Days of the request from Owner, or within such other period as mutually agreed. Contractor's Change Order Proposal shall be full compensation for

implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time, and including compensation for all delays in connection with such change in the Work and for any expense or inconvenience, disruption of schedule, or loss of efficiency or productivity occasioned by the change in the Work.

- C. COP negotiations: Upon receipt of the Change Order Proposal, or a request for equitable adjustment in the Contract Sum or Contract Time, or both, as provided in Sections 7.02 and 7.03, Owner may accept or reject the proposal, request further documentation, or negotiate acceptable terms with Contractor. Pending agreement on the terms of the Change Order, Owner may direct Contractor to proceed immediately with the Change Order Work. Contractor shall not proceed with any change in the Work until it has obtained Owner's approval. All Work done pursuant to any Owner-directed change in the Work shall be executed in accordance with the Contract Documents.
- D. Change Order as full payment and final settlement: If Owner and Contractor reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, such agreement shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of all claims for time and for direct, indirect, and consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity, related to any Work either covered or affected by the Change Order, or related to the events giving rise to the request for equitable adjustment.
- E. Failure to agree upon terms of Change Order; Final offer and Claims: If Owner and Contractor are unable to reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, Contractor may at any time in writing, request a final offer from Owner. Owner shall provide Contractor with its written response within 30 Days of Contractor's request. Owner may also provide Contractor with a final offer at any time. If Contractor rejects Owner's final offer, or the parties are otherwise unable to reach agreement, Contractor's only remedy shall be to file a Claim as provided in Part 8.
- F. Field Authorizations: The Owner may direct the Contractor to proceed with a change in the work through a written Field Authorization (also referred to as a Field Order) when the time required to price and execute a Change Order would impact the Project.

The Field Authorization shall describe and include the following:

1. The scope of work
2. An agreed upon maximum not-to-exceed amount
3. Any estimated change to the Contract Time
4. The method of final cost determination in accordance with the requirements of Part 7 of the General Conditions
5. The supporting cost data to be submitted in accordance with the requirements of Part 7 of the General Conditions

Upon satisfactory submittal by the Contractor and approval by the Owner of supporting cost data, a Change Order will be executed. The Owner will not make payment to the Contractor for Field Authorization work until that work has been incorporated into an executed Change Order.

7.02 CHANGE IN THE CONTRACT SUM

A. General Application

1. Contract Sum changes only by Change Order: The Contract Sum shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Sum in its Change Order Proposal.

2. Owner fault or negligence as basis for change in Contract Sum: If the cost of Contractor's performance is changed due to the fault or negligence of Owner, or anyone for whose acts Owner is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Sum in accordance with the following procedure. No change in the Contract Sum shall be allowed to the extent: Contractor's changed cost of performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible; the change is concurrently caused by Contractor and Owner; or the change is caused by an act of Force Majeure as defined in Section 3.05.
 - (a) Notice and record keeping for equitable adjustment: A request for an equitable adjustment in the Contract Sum shall be based on written notice delivered to Owner within 7 Days of the occurrence of the event giving rise to the request. For purposes of this part, "occurrence" means when Contractor knew, or in its diligent prosecution of the Work should have known, of the event giving rise to the request. If Contractor believes it is entitled to an adjustment in the Contract Sum, Contractor shall immediately notify Owner and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Owner access to any such records and, if requested shall promptly furnish copies of such records to Owner.

 - (b) Content of notice for equitable adjustment; Failure to comply: Contractor shall not be entitled to any adjustment in the Contract Sum for any occurrence of events or costs that occurred more than 7 Days before Contractor's written notice to Owner. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Sum; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and to the extent possible the amount of the adjustment in Contract Sum requested. Failure to properly give such written notice shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

 - (c) Contractor to provide supplemental information: Within 30 Days of the occurrence of the event giving rise to the request, unless Owner agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with subparagraph a. above with additional supporting data. Such additional data shall include, at a minimum: the amount of compensation requested, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the damages claimed, but that the damages claimed were actually a result of the act, event, or condition complained of and that the Contract Documents provide entitlement to an equitable adjustment to Contractor for such act, event, or condition; and documentation sufficiently detailed to permit an informed analysis of the request by Owner. When the request for compensation relates to a delay, or other change in Contract Time, Contractor shall demonstrate the impact on the critical path, in accordance with Section 7.03C. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

- (d) Contractor to proceed with Work as directed: Pending final resolution of any request made in accordance with this paragraph, unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.
 - (e) Contractor to combine requests for same event together: Any requests by Contractor for an equitable adjustment in the Contract Sum and in the Contract Time that arise out of the same event(s) shall be submitted together.
3. Methods for calculating Change Order amount: The value of any Work covered by a Change Order, or of any request for an equitable adjustment in the Contract Sum, shall be determined by one of the following methods:
- a. Fixed Price: On the basis of a fixed price as determined in paragraph 7.02B.
 - b. Unit Prices: By application of unit prices to the quantities of the items involved as determined in paragraph 7.02C.
 - c. Time and Materials: On the basis of time and material as determined in paragraph 7.02D.
4. Fixed price method is default; Owner may direct otherwise: When Owner has requested Contractor to submit a Change Order Proposal, Owner may direct Contractor as to which method in subparagraph 3 above to use when submitting its proposal. Otherwise, Contractor shall determine the value of the Work, or of a request for an equitable adjustment, on the basis of the fixed price method.

B. Change Order Pricing – Fixed Price

Procedures: When the fixed price method is used to determine the value of any Work covered by a Change Order, or of a request for an equitable adjustment in the Contract Sum, the following procedures shall apply:

- 1. Breakdown and itemization of details on COP: Contractor's Change Order Proposal, or request for adjustment in the Contract Sum, shall be accompanied by a complete itemization of the costs, including labor, material, subcontractor costs, and overhead and profit. The costs shall be itemized in the manner set forth below, and shall be submitted on breakdown sheets in a form approved by Owner.
- 2. Use of industry standards in calculating costs: All costs shall be calculated based upon appropriate industry standard methods of calculating labor, material quantities, and equipment costs.
- 3. Costs contingent on Owner's actions: If any of Contractor's pricing assumptions are contingent upon anticipated actions of Owner, Contractor shall clearly state them in the proposal or request for an equitable adjustment.
- 4. Markups on additive and deductive Work: The cost of any additive or deductive changes in the Work shall be calculated as set forth below, except that overhead and profit shall not be included on deductive changes in the Work. Where a change in the Work involves additive and deductive work by the same Contractor or Subcontractor, small tools, overhead, profit, bond and insurance markups will apply to the net difference.
- 5. Breakdown not required if change less than \$1,000: If the total cost of the change in the Work or request for equitable adjustment does not exceed \$1,000, Contractor shall not be required to submit a breakdown if the description of the change in the Work or request for equitable adjustment is sufficiently definitive for Owner to determine fair value.

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6. Breakdown required if change between \$1,000 and \$2,500: If the total cost of the change in the Work or request for equitable adjustment is between \$1,000 and \$2,500, Contractor may submit a breakdown in the following level of detail if the description of the change in the Work or if the request for equitable adjustment is sufficiently definitive to permit the Owner to determine fair value:
- a. lump sum labor;
 - b. lump sum material;
 - c. lump sum equipment usage;
 - d. overhead and profit as set forth below; and
 - e. insurance and bond costs as set forth below.
7. Components of increased cost: Any request for adjustment of Contract Sum based upon the fixed price method shall include only the following items:
- a. Craft labor costs: These are the labor costs determined by multiplying the estimated or actual additional number of craft hours needed to perform the change in the Work by the hourly labor costs. Craft hours should cover direct labor, as well as indirect labor due to trade inefficiencies. The hourly costs shall be based on the following:
 - (1) Basic wages and benefits: Hourly rates and benefits as stated on the Department of Labor and Industries approved "statement of intent to pay prevailing wages" or a higher amount if approved by the Owner. Direct supervision shall be a reasonable percentage not to exceed 15% of the cost of direct labor. No supervision markup shall be allowed for a working supervisor's hours.
 - (2) Worker's insurance: Direct contributions to the state of Washington for industrial insurance; medical aid; and supplemental pension, by the class and rates established by the Department of Labor and Industries.
 - (3) Federal insurance: Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.
 - (4) Travel allowance: Travel allowance and/or subsistence, if applicable, not exceeding those allowances established by regional labor union agreements, which are itemized and identified separately.
 - (5) Safety: Cost incurred due to the Washington Industrial Safety and Health Act, which shall be a reasonable percentage not to exceed 2% of the sum of the amounts calculated in (1), (2), and (3) above.
 - b. Material costs: This is an itemization of the quantity and cost of materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs, second from supplier quotations or if these are not available, from standard industry pricing guides. Material costs shall consider all available discounts. Freight costs, express charges, or special delivery charges, shall be itemized.

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- c. Equipment costs: This is an itemization of the type of equipment and the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work. Costs will be allowed for construction equipment only if used solely for the changed Work, or for additional rental costs actually incurred by the Contractor. Equipment charges shall be computed on the basis of actual invoice costs or if owned, from the current edition of one of the following sources:
- (1) Associated General Contractors Washington State Department of Transportation (AGC WSDOT) Equipment Rental Agreement current edition, on the Contract execution date.
 - (2) The National Electrical Contractors Association for equipment used on electrical work.
 - (3) The Mechanical Contractors Association of America for equipment used on mechanical work.

The EquipmentWatch Rental Rate Blue Book shall be used as a basis for establishing rental rates of equipment not listed in the above sources. The maximum rate for standby equipment shall not exceed that shown in the AGC WSDOT Equipment Rental Agreement, current edition on the Contract execution date.

- d. Allowance for small tools, expendables & consumable supplies: Small tools consist of tools which cost \$250 or less and are normally furnished by the performing contractor. The maximum rate for small tools shall not exceed the following:
- (1) 3% for Contractor: For Contractor, 3% of direct labor costs.
 - (2) 5% for Subcontractors: For Subcontractors, 5% of direct labor costs.

Expendables and consumables supplies directly associated with the change in Work must be itemized.

- e. Subcontractor costs: This is defined as payments Contractor makes to Subcontractors for changed Work performed by Subcontractors of any tier. The Subcontractors' cost of Work shall be calculated and itemized in the same manner as prescribed herein for Contractor.
- f. Allowance for overhead: This is defined as costs of any kind attributable to direct and indirect delay, acceleration, or impact, added to the total cost to Owner of any change in the Contract Sum. If the Contractor is compensated under Section 7.03D, the amount of such compensation shall be reduced by the amount Contractor is otherwise entitled to under this subsection (f). This allowance shall compensate Contractor for all noncraft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B&O taxes, office engineering, estimating costs, additional overhead because of extended time, and any other cost incidental to the change in the Work. It shall be strictly limited in all cases to a reasonable amount, mutually acceptable, or if none can be agreed upon to an amount not to exceed the rates below:
- (1) Projects less than \$3 million: For projects where the Contract Award Amount is under \$3 million, the following shall apply:

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- (a) Contractor markup on Contractor Work: For Contractor, for any Work actually performed by Contractor's own forces, 16% of the first \$50,000 of the cost, and 4% of the remaining cost, if any.
 - (b) Subcontractor markup for Subcontractor Work: For each Subcontractor (including lower tier subcontractors), for any Work actually performed by its own forces, 16% of the first \$50,000 of the cost, and 4% of the remaining cost, if any.
 - (c) Contractor markup for Subcontractor Work: For Contractor, for any work performed by its Subcontractor(s) 6% of the first \$50,000 of the amount due each Subcontractor, and 4% of the remaining amount if any.
 - (d) Subcontractor markup for lower tier Subcontractor Work: For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 4% of the first \$50,000 of the amount due the sub-Subcontractor, and 2% of the remaining amount if any.
 - (e) Basis of cost applicable for markup: The cost to which overhead is to be applied shall be developed in accordance with Section 7.02B 7a. – e.
- (2). Projects more than \$3 million: For projects where the Contract Award Amount is equal to or exceeds \$3 million, the following shall apply:
- (a) Contractor markup on Contractor Work: For Contractor, for any Work actually performed by Contractor's own forces, 12% of the first \$50,000 of the cost, and 4% of the remaining cost, if any.
 - (b) Subcontractor markup for Subcontractor Work: For each Subcontractor (including lower tier subcontractors), for any Work actually performed by its own forces, 12% of the first \$50,000 of the cost, and 4% of the remaining cost, if any.
 - (c) Contractor markup for Subcontractor Work: For Contractor, for any Work performed by its Subcontractor(s), 4% of the first \$50,000 of the amount due each Subcontractor, and 2% of the remaining amount if any.
 - (d) Subcontractor markup for lower tier Subcontractor Work: For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 4% of the first \$50,000 of the amount due the sub-Subcontractor, and 2% of the remaining amount if any.
 - (e) Basis of cost applicable for markup: The cost to which overhead is to be applied shall be developed in accordance with Section 7.02B 7a. – e.
- g. Allowance for profit: Allowance for profit is an amount to be added to the cost of any change in contract sum, but not to the cost of change in Contract Time for which contractor has been compensated pursuant to the conditions set forth in Section 7.03. It shall be limited to a reasonable amount, mutually acceptable, or if none can be agreed upon, to an amount not to exceed the rates below:
- (1) Contractor / Subcontractor markup for self-performed Work: For Contractor or Subcontractor of any tier for work performed by their forces, 6% of the cost developed in accordance with Section 7.02B 7a. – e.

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- (2) Contractor / Subcontractor markup for Work performed at lower tier: For Contractor or Subcontractor of any tier for work performed by a subcontractor of a lower tier, 4% of the subcontract cost developed in accordance with Section 7.02B 7a. – h.
- h. Insurance and bond premiums: Cost of change in insurance or bond premium: This is defined as:
 - (1) Contractor's liability insurance: The cost of any changes in Contractor's liability insurance arising directly from execution of the Change Order; and
 - (2) Payment and Performance Bond: The cost of the additional premium for Contractor's bond arising directly from the changed Work.

The cost of any change in insurance or bond premium shall be added after overhead and allowance for profit are calculated in accordance with subparagraph f. and g above.

C. Change Order Pricing – Unit Prices

- 1. Content of Owner authorization: Whenever Owner authorizes Contractor to perform Work on a unit-price basis, Owner's authorization shall clearly state:
 - a. Scope: Scope of work to be performed;
 - b. Reimbursement basis: Type of reimbursement including pre-agreed rates for material quantities; and
 - c. Reimbursement limit: Cost limit of reimbursement.
- 2. Contractor responsibilities: Contractor shall:
 - a. Cooperate with Owner and assist in monitoring the Work being performed. As requested by Owner, Contractor shall identify workers assigned to the Change Order Work and areas in which they are working;
 - b. Leave access as appropriate for quantity measurement; and
 - c. Not exceed any cost limit(s) without Owner's prior written approval.
- 3. Cost breakdown consistent with Fixed Price requirements: Contractor shall submit costs in accordance with paragraph 7.02B and satisfy the following requirements:
 - a. Unit prices must include overhead, profit, bond and insurance premiums: Unit prices shall include reimbursement for all direct and indirect costs of the Work, including overhead, profit, bond, and insurance costs; and
 - b. Owner verification of quantities: Quantities must be supported by field measurement statements signed by Owner.

D. Change Order Pricing – Time-and-Material Prices

- 1. Content of Owner authorization: Whenever Owner authorizes Contractor to perform Work on a time-and-material basis, Owner's authorization shall clearly state:
 - a. Scope: Scope of Work to be performed;

- b. Reimbursement basis: Type of reimbursement including pre-agreed rates, if any, for material quantities or labor; and
 - c. Reimbursement limit: Cost limit of reimbursement.
2. Contractor responsibilities: Contractor shall:
- a. Identify workers assigned: Cooperate with Owner and assist in monitoring the Work being performed. As requested by Owner, identify workers assigned to the Change Order Work and areas in which they are working;
 - b. Provide daily timesheets: Identify on daily time sheets all labor performed in accordance with this authorization. Submit copies of daily time sheets within 2 working days for Owner's review.
 - c. Allow Owner to measure quantities: Leave access as appropriate for quantity measurement;
 - d. Perform Work efficiently: Perform all Work in accordance with this section as efficiently as possible; and
 - e. Not exceed Owner's cost limit: Not exceed any cost limit(s) without Owner's prior written approval.
3. Cost breakdown consistent with Fixed Price requirements: Contractor shall submit costs in accordance with paragraph 7.02B and additional verification supported by:
- a. Timesheets: Labor detailed on daily time sheets; and
 - b. Invoices: Invoices for material.

7.03 CHANGE IN THE CONTRACT TIME

- A. COP requests for Contract Time: The Contract Time shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Time in its Change Order Proposal.
- B. Time extension permitted if not Contractor's fault: If the time of Contractor's performance is changed due to an act of Force Majeure, or due to the fault or negligence of Owner or anyone for whose acts Owner is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Time in accordance with the following procedure. No adjustment in the Contract Time shall be allowed to the extent Contractor's changed time of performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible.
- 1. Notice and record keeping for Contract Time request: A request for an equitable adjustment in the Contract Time shall be based on written notice delivered within 7 Days of the occurrence of the event giving rise to the request. If Contractor believes it is entitled to adjustment of Contract Time, Contractor shall immediately notify Owner and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Owner access to any such record and if requested, shall promptly furnish copies of such record to Owner.
 - 2. Timing and content of Contractor's Notice: Contractor shall not be entitled to an adjustment in the Contract Time for any events that occurred more than 7 Days before Contractor's written notice to Owner. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the

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Contract Time; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and to the extent possible the amount of the adjustment in Contract Time requested. Failure to properly give such written notice shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

3. Contractor to provide supplemental information: Within 30 Days of the occurrence of the event giving rise to the request, unless Owner agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with subparagraph 7.03B.2 with additional supporting data. Such additional data shall include, at a minimum: the amount of delay claimed, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the delay claimed, but that the delay claimed was actually a result of the act, event, or condition complained of, and that the Contract Documents provide entitlement to an equitable adjustment in Contract Time for such act, event, or condition; and supporting documentation sufficiently detailed to permit an informed analysis of the request by Owner. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.
 4. Contractor to proceed with Work as directed: Pending final resolution of any request in accordance with this paragraph, unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.
- C. Contractor to demonstrate impact on critical path of schedule: Any change in the Contract Time covered by a Change Order, or based on a request for an equitable adjustment in the Contract Time, shall be limited to the change in the critical path of Contractor's schedule attributable to the change of Work or event(s) giving rise to the request for equitable adjustment. Any Change Order Proposal or request for an adjustment in the Contract Time shall demonstrate the impact on the critical path of the schedule. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event: had a specific impact on the critical path, and except in case of concurrent delay, was the sole cause of such impact; and could not have been avoided by resequencing of the Work or other reasonable alternatives.
- D. Cost of change in Contract Time: Contractor may request compensation for the cost of a change in Contract Time in accordance with this paragraph, 7.03D, subject to the following conditions:
1. Must be solely fault of Owner or A/E: The change in Contract Time shall solely be caused by the fault or negligence of Owner or A/E;
 2. Procedures: Contractor shall follow the procedure set forth in paragraph 7.03B;
 3. Demonstrate impact on critical path: Contractor shall establish the extent of the change in Contract Time in accordance with paragraph 7.03C; and
 4. Limitations on daily costs: The daily cost of any change in Contract Time shall be limited to the items below, less the amount of any change in the Contract Sum the Contractor may otherwise be entitled to pursuant to Section 7.02B 7f for any change in the Work that contributed to this change in Contract Time:
 - a. Non-productive supervision or labor: cost of nonproductive field supervision or labor extended because of delay;
 - b. Weekly meetings and indirect activities: cost of weekly meetings or similar indirect activities extended because of the delay;

- c. Temporary facilities or equipment rental: cost of temporary facilities or equipment rental extended because of the delay;
- d. Insurance premiums: cost of insurance extended because of the delay;
- e. Overhead: general and administrative overhead in an amount to be agreed upon, but not to exceed 3% of the Contract Award Amount divided by the originally specified Contract Time for each Day of the delay.

PART 8 – CLAIMS AND DISPUTE RESOLUTION

8.01 CLAIMS PROCEDURE

- A. Claim is Contractor's remedy: If the parties fail to reach agreement on the terms of any Change Order for Owner-directed Work as provided in Section 7.01, or on the resolution of any request for an equitable adjustment in the Contract Sum as provided in Section 7.02 or the Contract Time as provided in Section 7.03, Contractor's only remedy shall be to file a Claim with Owner as provided in this section.
- B. Claim filing deadline for Contractor: Contractor shall file its Claim within 120 Days from Owner's final offer made in accordance with paragraph 7.01E, or by the date of Final Acceptance, whichever occurs first.
- C. Claim must cover all costs and be documented: The Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor may be entitled. It shall be fully substantiated and documented. At a minimum, the Claim shall contain the following information:
 - 1. Factual statement of Claim: A detailed factual statement of the Claim for additional compensation and time, if any, providing all necessary dates, locations, and items of Work affected by the Claim;
 - 2. Dates: The date on which facts arose which gave rise to the Claim;
 - 3. Owner and A/E employee's knowledgeable about Claim: The name of each employee of Owner or A/E knowledgeable about the Claim;
 - 4. Support from Contract Documents: The specific provisions of the Contract Documents which support the Claim;
 - 5. Identification of other supporting information: The identification of any documents and the substance of any oral communications that support the Claim;
 - 6. Copies of supporting documentation: Copies of any identified documents, other than the Contract Documents, that support the Claim;
 - 7. Details on Claim for Contract Time: If an adjustment in the Contract Time is sought: the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted; and Contractor's analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time;
 - 8. Details on Claim for adjustment of Contract Sum: If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories set forth in, and in the detail as required by Section 7.02; and

9. Statement certifying Claim: A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Owner is liable.
- D. Owner's response to Claim filed: After Contractor has submitted a fully documented Claim that complies with all applicable provisions of Parts 7 and 8, Owner shall respond, in writing, to Contractor as follows:
1. Response time for Claim less than \$50,000: If the Claim amount is less than \$50,000, with a decision within 60 Days from the date the Claim is received; or
 2. Response time for Claim of \$50,000 or more: If the Claim amount is \$50,000 or more, with a decision within 60 Days from the date the Claim is received, or with notice to Contractor of the date by which it will render its decision. Owner will then respond with a written decision in such additional time.
- E. Owner's review of Claim and finality of decision: To assist in the review of Contractor's Claim, Owner may visit the Project site, or request additional information, in order to fully evaluate the issues raised by the Claim. Contractor shall proceed with performance of the Work pending final resolution of any Claim. Owner's written decision as set forth above shall be final and conclusive as to all matters set forth in the Claim, unless Contractor follows the procedure set forth in Section 8.02.
- F. Waiver of Contractor rights for failure to comply with this Section: Any Claim of the Contractor against the Owner for damages, additional compensation, or additional time, shall be conclusively deemed to have been waived by the Contractor unless made in accordance with the requirements of this Section.

8.02 ARBITRATION

- A. Timing of Contractor's demand for arbitration: If Contractor disagrees with Owner's decision rendered in accordance with paragraph 8.01D, Contractor shall provide Owner with a written demand for arbitration. No demand for arbitration of any such Claim shall be made later than 30 Days after the date of Owner's decision on such Claim; failure to demand arbitration within said 30 Day period shall result in Owner's decision being final and binding upon Contractor and its Subcontractors.
- B. Filing of Notice for arbitration: Notice of the demand for arbitration shall be filed with the American Arbitration Association (AAA), with a copy provided to Owner. The parties shall negotiate or mediate under the Voluntary Construction Mediation Rules of the AAA, or mutually acceptable service, before seeking arbitration in accordance with the Construction Industry Arbitration Rules of AAA as follows:
1. Claims less than \$30,000: Disputes involving \$30,000 or less shall be conducted in accordance with the Northwest Region Expedited Commercial Arbitration Rules; or
 2. Claims greater than \$30,000: Disputes over \$30,000 shall be conducted in accordance with the Construction Industry Arbitration Rules of the AAA, unless the parties agree to use the expedited rules.
- C. Arbitration is forum for resolving Claims: All Claims arising out of the Work shall be resolved by arbitration. The judgment upon the arbitration award may be entered, or review of the award may

occur, in the superior court having jurisdiction thereof. No independent legal action relating to or arising from the Work shall be maintained.

- D. Owner may combine Claims into same arbitration: Claims between Owner and Contractor, Contractor and its Subcontractors, Contractor and A/E, and Owner and A/E shall, upon demand by Owner, be submitted in the same arbitration or mediation.
- E. Settlement outside of arbitration to be documented in Change Order: If the parties resolve the Claim prior to arbitration judgment, the terms of the resolution shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of the Claim, including all claims for time and for direct, indirect, or consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity.

8.03 CLAIMS AUDITS

- A. Owner may audit Claims: All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim or to permit Owner access to the books and records of Contractor, or Subcontractors of any tier, shall constitute a waiver of the Claim and shall bar any recovery.
- B. Contractor to make documents available: In support of Owner audit of any Claim, Contractor shall, upon request, promptly make available to Owner the following documents:
1. Daily time sheets and supervisor's daily reports;
 2. Collective bargaining agreements;
 3. Insurance, welfare, and benefits records;
 4. Payroll registers;
 5. Earnings records;
 6. Payroll tax forms;
 7. Material invoices, requisitions, and delivery confirmations;
 8. Material cost distribution worksheet;
 9. Equipment records (list of company equipment, rates, etc.);
 10. Vendors', rental agencies', Subcontractors', and agents' invoices;
 11. Contracts between Contractor and each of its Subcontractors, and all lower-tier Subcontractor contracts and supplier contracts;
 12. Subcontractors' and agents' payment certificates;
 13. Cancelled checks (payroll and vendors);
 14. Job cost report, including monthly totals;
 15. Job payroll ledger;
 16. Planned resource loading schedules and summaries;

17. General ledger;
 18. Cash disbursements journal;
 19. Financial statements for all years reflecting the operations on the Work. In addition, the Owner may require, if it deems it appropriate, additional financial statements for 3 years preceding execution of the Work;
 20. Depreciation records on all company equipment whether these records are maintained by the company involved, its accountant, or others;
 21. If a source other than depreciation records is used to develop costs for Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;
 22. All nonprivileged documents which relate to each and every Claim together with all documents which support the amount of any adjustment in Contract Sum or Contract Time sought by each Claim;
 23. Work sheets or software used to prepare the Claim establishing the cost components for items of the Claim including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, all documents which establish the time periods, individuals involved, the hours for the individuals, and the rates for the individuals; and
 24. Work sheets, software, and all other documents used by Contractor to prepare its bid.
- C. Contractor to provide facilities for audit and shall cooperate: The audit may be performed by employees of Owner or a representative of Owner. Contractor, and its Subcontractors, shall provide adequate facilities acceptable to Owner, for the audit during normal business hours. Contractor, and all Subcontractors, shall make a good faith effort to cooperate with Owner's auditors.

PART 9 – TERMINATION OF THE WORK

9.01 TERMINATION BY OWNER FOR CAUSE

- A. 7 Day Notice to Terminate for Cause: Owner may, upon 7 Days written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:
1. Contractor fails to prosecute Work: Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;
 2. Contractor bankrupt: Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;
 3. Contractor fails to correct Work: Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;
 4. Contractor fails to supply workers or materials: Contractor repeatedly fails to supply skilled workers or proper materials or equipment;
 5. Contractor failure to pay Subcontractors or labor: Contractor repeatedly fails to make prompt payment due to Subcontractors or for labor;

6. Contractor violates laws: Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or
 7. Contractor in material breach of Contract: Contractor is otherwise in material breach of any provision of the Contract Documents.
- B. Owner's actions upon termination: Upon termination, Owner may at its option:
1. Take possession of Project site: Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;
 2. Accept assignment of Subcontracts: Accept assignment of subcontracts pursuant to Section 5.20; and
 3. Finish the Work: Finish the Work by whatever other reasonable method it deems expedient.
- C. Surety's role: Owner's rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.
- D. Contractor's required actions: When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 9.02B, and shall not be entitled to receive further payment until the Work is accepted.
- E. Contractor to pay for unfinished Work: If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E's services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of Contractor's actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. These obligations for payment shall survive termination.
- F. Contractor and Surety still responsible for Work performed: Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.
- G. Conversion of "Termination for Cause" to "Termination for Convenience": If Owner terminates Contractor for cause and it is later determined that none of the circumstances set forth in paragraph 9.01A exist, then such termination shall be deemed a termination for convenience pursuant to Section 9.02.

9.02 TERMINATION BY OWNER FOR CONVENIENCE

- A. Owner Notice of Termination for Convenience: Owner may, upon written notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.
- B. Contractor response to termination Notice: Unless Owner directs otherwise, after receipt of a written notice of termination for either cause or convenience, Contractor shall promptly:
1. Cease Work: Stop performing Work on the date and as specified in the notice of termination;

2. No further orders or Subcontracts: Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;
 3. Cancel orders and Subcontracts: Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;
 4. Assign orders and Subcontracts to Owner: Assign to Owner all of the right, title, and interest of Contractor in all orders and subcontracts;
 5. Take action to protect the Work: Take such action as may be necessary or as directed by Owner to preserve and protect the Work, Project site, and any other property related to this Project in the possession of Contractor in which Owner has an interest; and
 6. Continue performance not terminated: Continue performance only to the extent not terminated
- C. Terms of adjustment in Contract Sum if Contract terminated: If Owner terminates the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for an equitable adjustment for its reasonable direct costs incurred prior to the effective date of the termination, plus reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages, whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7.
- D. Owner to determine whether to adjust Contract Time: If Owner terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Owner.

PART 10 – MISCELLANEOUS PROVISIONS

10.01 GOVERNING LAW

Applicable law and venue: The Contract Documents and the rights of the parties herein shall be governed by the laws of the state of Washington. Venue shall be in the county in which Owner's principal place of business is located, unless otherwise specified.

10.02 SUCCESSORS AND ASSIGNS

Bound to successors; Assignment of Contract: Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party shall assign the Work without written consent of the other, except that Contractor may assign the Work for security purposes, to a bank or lending institution authorized to do business in the state of Washington. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations set forth in the Contract Documents.

10.03 MEANING OF WORDS

Meaning of words used in Specifications: Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority,

whether such reference be specific or by implication, shall be to the latest standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in these Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference shall apply to as many such articles as are shown on the drawings, or required to complete the installation.

10.04 RIGHTS AND REMEDIES

No waiver of rights: No action or failure to act by Owner or A/E shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall action or failure to act constitute approval or an acquiescence in a breach therein, except as may be specifically agreed in writing.

10.05 CONTRACTOR REGISTRATION

Contractor must be registered or licensed: Pursuant to RCW 39.06, Contractor shall be registered or licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27.

10.06 TIME COMPUTATIONS

Computing time: When computing any period of time, the day of the event from which the period of time begins shall not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day that is not a weekend or holiday. When the period of time allowed is less than 7 days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation.

10.07 RECORDS RETENTION

Six year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit in accordance with Section 8.03, shall be retained for a period of not less than 6 years after the date of Final Acceptance.

10.08 THIRD-PARTY AGREEMENTS

No third party relationships created: The Contract Documents shall not be construed to create a contractual relationship of any kind between: A/E and Contractor; Owner and any Subcontractor; or any persons other than Owner and Contractor.

10.09 ANTITRUST ASSIGNMENT

Contractor assigns overcharge amounts to Owner: Owner and Contractor recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, Contractor hereby assigns to Owner any and all claims for such overcharges as to goods, materials, and equipment purchased in connection with the Work performed in accordance with the Contract Documents, except as to overcharges which result from antitrust violations commencing after the Contract Sum is established and which are not passed on to Owner under a Change Order. Contractor shall put a similar clause in its Subcontracts, and require a similar clause in its sub-Subcontracts, such that all claims for such overcharges on the Work are passed to Owner by Contractor.

10.10 HEADINGS AND CAPTIONS

Headings for convenience only: All headings and captions used in these General Conditions are only for convenience of reference, and shall not be used in any way in connection with the meaning, effect, interpretation, construction, or enforcement of the General Conditions, and do not define the limit or describe the scope or intent of any provision of these General Conditions.

**SUPPLEMENTAL CONDITIONS
FOR WASHINGTON STATE FACILITIES CONSTRUCTION**
(Paragraphs keyed to the State's General Conditions)

2.02 Replaces Section 2.02 – INSURANCE COVERAGE LIMITS and CERTIFICATES

A. Insurance Coverage Certificates and Policies

The Contractor shall furnish acceptable proof of insurance coverage on the state of Washington Certificate of Insurance form SF500A, dated 07/02/92 or ACORD form, as well as copies of insurance policies.

B. Required Insurance Coverages

1. For a contract less than \$100,000.00, the coverage required is:

- a. Comprehensive General Liability Insurance – The Contractor shall at all times during the term of this contract, at its cost and expense, carry and maintain general public liability insurance, including contractual liability, against claims for bodily injury, personal injury, death or property damage occurring or arising out of services provided under this contract. This insurance shall cover claims caused by any act, omission, or negligence of the Contractor or its officers, agents, representatives, assigns or servants. The limits of liability insurance, which may be increased as deemed necessary by the contracting parties, shall be:

Each Occurrence	\$1,000,000.00
General Aggregate Limits (other than products – commercial operations)	\$1,000,000.00
Products – Commercial Operations Limit	\$1,000,000.00
Personal and Advertising Injury Limit	\$1,000,000.00
Fire Damage Limit (any one fire)	\$50,000.00
Medical Expense Limit (any one person)	\$5,000.00

- b. If the contract is for underground utility work, then the Contractor shall provide proof of insurance for that above in the form of Explosion, Collapse and Underground (XCU) coverage.

- c. Employers Liability on an occurrence basis in an amount not less than \$1,000,000.00 per occurrence.

2. For contracts over \$100,000.00 but less than \$5,000,000.00 the contractor shall obtain the coverage limits as listed for contracts below \$100,000.00 and General Aggregate and Products – Commercial Operations Limit of not less than \$2,000,000.00.

3. Coverage for Comprehensive General Bodily Injury Liability Insurance for a contract over \$5,000,000.00 is:

Each Occurrence	\$2,000,000.00
General Aggregate Limits (other than products – commercial operations)	\$4,000,000.00
Products – Commercial Operations limit	\$4,000,000.00
Personal and Advertising Injury Limit	\$2,000,000.00

Fire Damage Limit (any one fire)	\$50,000.00
Medical Expense Limit (any one Person)	\$5,000.00

4. For all Contracts – Automobile Liability: in the event that services delivered pursuant to this contract involve the use of vehicles or the transportation of clients, automobile liability insurance shall be required. If Contractor-owned personal vehicles are used, a Business Automobile Policy covering at a minimum Code 2 “owned autos only” must be secured. If Contractor employee’s vehicles are used, the Contractor must also include under the Business Automobile Policy Code 9, coverage for non-owned autos. The minimum limits for automobile liability is: \$1,000,000.00 per occurrence, using a combined single limit for bodily injury and property damage.
5. For Contracts for Hazardous Substance Removal (Asbestos Abatement, PCB Abatement, etc.)
 - a. In addition to providing insurance coverage for the project as outlined above, the Contractor shall provide Pollution Liability insurance for the hazardous substance removal as follows:

<u>EACH OCCURRENCE</u>	<u>AGGREGATE</u>
\$500,000.00	\$1,000,000.00

or \$1,000,000.00 each occurrence/aggregate bodily injury and property damage combined single limit.

- 1) Insurance certificate must state that the insurer is covering hazardous substance removal.
- 2) Should this insurance be secured on a “claims made” basis, the coverage must be continuously maintained for one year following the project’s “final completion” through official completion of the project, plus one year following.

For Contracts where hazardous substance removal is a subcomponent of contracted work, the general contractor shall provide to the Owner a certificate of insurance for coverage as defined in 5a. above. The State of Washington must be listed as an additional insured. This certificate of insurance must be provided to the Owner prior to commencing work.

2.04 Replaces Section 2.04 - PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, plus state sales tax, shall be furnished for the Work, using the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. Prior to execution of a Change Order that, cumulatively with previous Change Orders, increases the Contract Award Amount by 15% or more, the Contractor shall provide either new payment and performance bonds for the revised Contract Sum, or riders to the existing payment and performance bonds increasing the amount of the bonds. The Contractor shall likewise provide additional bonds or riders when subsequent Change Orders increase the Contract Sum by 15% or more.

No payment or performance bond is required if the Contract Sum is \$150,000 or less and the Contractor or General Contractor/Construction Manager agrees that Owner may, in lieu of the bond, retain 10% of the Contract Sum for the period allowed by RCW 39.08.010.

3.02 Replaces Section 3.02 B – CONSTRUCTION SCHEDULE

B. Form of Progress Schedule: The Progress Schedule shall be in the form of a Critical Path Method (CPM) logic network or, with the approval of the Owner, a bar chart schedule may be submitted. The scheduling of construction is the responsibility of the Contractor and is included in the contract to assure adequate planning and execution of the work. The schedule will be used to evaluate progress of the work for payment based on the Schedule of Values. The schedule shall show the Contractor's planned order and interdependence of activities, and sequence of work. As a minimum the schedule shall include:

1. Date of Notice to Proceed;
2. Activities (resources, durations, individual responsible for activity, early starts, late starts, early finishes, late finishes, etc.);
3. Utility Shutdowns;
4. Interrelationships and dependence of activities;
5. Planned vs. actual status for each activity;
6. Substantial completion;
7. Punch list;
8. Final inspection;
9. Final completion, and
10. Float time

The Schedule Duration shall be based on the Contract Time of Completion listed on the Bid Form. The Owner shall not be obligated to accept any Early Completion Schedule suggested by the Contractor. The Contract Time for Completion shall establish the Schedule Completion Date.

If the Contractor feels that the work can be completed in less than the Specified Contract Time, then the Surplus Time shall be considered Project Float. This Float time shall be shown on the Project Schedule. It shall be available to accommodate changes in the work and unforeseen conditions.

Neither the Contractor nor the Owner have exclusive right to this Float Time. It belongs to the project.

5.01 Replaces Section 5.01 B & D - CONTRACTOR CONTROL AND SUPERVISION

B. Competent Superintendent required: Performance of the Work shall be directly supervised by a competent superintendent who has authority to act for Contractor. The superintendent must be satisfactory to the Owner and shall not be changed without the prior written consent of Owner. Owner may require Contractor to remove the superintendent from the Work or Project site, at no cost to the Owner for delay or any other claim, if Owner reasonably deems the superintendent incompetent, negligent, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition. Noncompliance with the Owner's request to remove and replace the superintendent for a material reason shall also be grounds for terminating the Contract for cause.

D. Contractor to employ competent and disciplined workforce: Contractor shall enforce strict discipline and good order among all of the Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor's employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons. Owner may, by written notice, require Contractor to remove from the Work or Project site, at no cost to the Owner for delay or any other claim, any employee Owner reasonably deems incompetent,

negligent, or otherwise objectionable. Noncompliance with the Owner's request to remove and replace personnel at any level for a material reason shall also be grounds for terminating the Contract for cause.

5.02 Replaces Section 5.02 B – PERMITS, FEES AND NOTICES

- B. Allowances for permit fees: The actual cost of the general building permit (only) and the public utility hook-up fees will be a direct reimbursement to the Contractor or paid ***directly to the permitting agency by the Owner. Fees for these permits should not be included by the Contractor in his bid amount***

Add New Section 5.02 D – PERMITS, FEES, AND NOTICES

- D. Contractor to submit copies: The General Contractor shall submit copies of each valid permit required on the project to the Owner's representative. Nothing in this part shall be construed as imposing a duty upon the Owner or A/E to secure permits.

5.04 Replaces 5.04, Section A – PREVAILING WAGES

- A. Contractor to pay Prevailing Wages or applicable Federal Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate. If applicable, the Contractor shall comply with all Federal Funding requirements of the Davis Bacon Act that will be addressed in a separate "DIVISION 00 SPECIAL CONDITIONS" specification section that will be based on the specific requirements of the funding source. .

5.04 Replaces 5.04, Section G – Certified Payrolls

- G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any subcontractor shall submit a certified copy of payroll records if requested. If applicable, the Contractor shall comply with all Federal Funding requirements of the Davis Bacon Act that will be addressed in a separate "DIVISION 00 SPECIAL CONDITIONS" specification section that will be based on the specific requirements of the funding source.

5.06 Replaces 5.06, Section A – NONDISCRIMINATION

- A. Discrimination prohibited by applicable laws: The Contractor and all Subcontractors shall comply with all applicable federal and state non-discrimination laws, regulations, and policies. No person shall, on the grounds of age, race, creed, color, sex, sexual orientation, religion, national origin, marital status, honorably discharged veteran or military status, or disability (physical, mental, or sensory) be denied the benefits of, or otherwise be subjected to discrimination under any project, program, or activity, funded, in whole or in part, under this Agreement.

5.07 Replaces 5.07, Section A – SAFETY PRECAUTIONS

- A. In performing this contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoid work interruptions. For these purposes, the Contractor shall:
1. Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the contractor and each subcontractor on the work site. The Contractor shall submit a site-specific safety plan to the Owner's representative prior to the initial scheduled construction meeting.
 2. Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights, ladders, scaffolding, staging, runways, hoist, construction elevators, shoring, temporary lighting, grounded outlets, wiring, hazardous materials, vehicles, construction processes, and equipment required by all applicable state, federal, and local laws and regulations.
 3. Comply with the State Environmental Policy Act (SEPA), Clean Air Act, Shoreline Management Act, and other applicable federal, state, and local statutes and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources.
 4. Post all permits, notices, and/or approvals in a conspicuous location at the construction site.
 5. Provide any additional measures that the Owner determines to be reasonable and necessary for ensuring a safe environment in areas open to the public. Nothing in this part shall be construed as imposing a duty upon the Owner or A/E to prescribe safety conditions relating to employees, public, or agents of the Contractors.

5.20 Add New Paragraph A. 6. – SUBCONTRACTORS AND SUPPLIERS

6. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

5.20 Replace Paragraph B – SUBCONTRACTORS AND SUPPLIERS

- B. Use qualified Subcontractors: Contractor shall utilize Subcontractors and suppliers, which are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom the Owner has a reasonable objection, and shall obtain Owner's written consent before making any substitutions or additions.

7.02 Replace Paragraph B.7.c – CHANGE IN THE CONTRACT SUM, Change Order Pricing – Fixed Price, Components of Increased Cost

- c. Equipment costs: This is an itemization of the type of equipment and the estimated or actual length of time the construction equipment appropriate for the Work is or will be

used on the change in the Work. Costs will be allowed for construction equipment only if used solely for the changed Work, or for additional rental costs actually incurred by the Contractor. Equipment charges shall be computed on the basis of actual invoice costs or if owned, from the current edition of one of the following sources:

- (1) The National Electrical Contractors Association for equipment used on electrical work.
- (2) The Mechanical Contractors Association of America for equipment used on mechanical work.
- (3) The EquipmentWatch Fleet Manager Estimator Package (digital). The maximum rate for standby equipment shall not exceed that shown in the Associated General Contractors Washington State Department of Transportation (AGC WSDOT) Equipment Rental Agreement, current edition on the Contract execution date.

10.11 Add Part 10.11 – DIVERSE BUSINESS PARTICIPATION

The state of Washington encourages participation in all of its contracts by Diverse Businesses as found in RCW Chapters 39, 43, and WAC 326. The voluntary Diverse Business goal of 26%, which is an aggregate of: 10% Minority Business Enterprises (MBE), 6% Women Business Enterprises (WBE), 5% Veteran-owned Business, and 5% Washington Small Businesses self-identified in the Washington Electronic Business Solution (WEBS) <http://www.des.wa.gov/services/ContractingPurchasing/Business/Pages/WEBSRegistration.aspx>. Contractors are encouraged to meet or exceed the project goals in the advertisement by any level of participation, regardless of category.

DES reserves the right to adjust the voluntary participation goals.

Businesses are encouraged to register in WEBS, as well as registering as a state certified M/WBE/Veteran Business.

For reporting, Contractor is required to register and create an account in the DES Diversity Compliance Program (B2GNow) at <https://des.diversitycompliance.com/>.

Every month for the duration of your contract, and while your contract is active in the B2Gnow system, submit and accurately maintain the following information through B2Gnow:

- a. Payments received by the prime contractor from the Agency
- b. Payments paid to each subcontractor
- c. Payments paid to each supplier

You must also ensure the following information is reported in the B2Gnow system by your subcontractors and lower-tier subcontractors for the duration of your contract:

- a. Confirmation of payments from the prime contractor to the subcontractor
- b. Payment reporting to 2nd tier (and lower) subcontractors

10.12 Add Part 10.12 - MINIMUM LEVELS OF APPRENTICESHIP PARTICIPATION

In accordance with RCW 39.04.320, the State of Washington requires 15% apprenticeship participation for projects estimated to cost one million dollars or more.

- A. Apprentice participation, under this contract, may be counted towards the required percentage (%) only if the apprentices are from an apprenticeship program registered and approved by the Washington State Apprenticeship and Training Council (RCW 49.04 and WAC 296-05).

- B. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530 by phone at (360) 902-5320, and e-mail at Apprentice@Lni.wa.gov, to obtain information on available apprenticeship programs.
- C. For each project that has apprentice requirements, the contractor shall submit a “**Statement of Apprentice and Journeyman Participation**” on forms provided by the Department of Enterprise Services, with every request for progress payment. The Contractor shall submit consolidated and cumulative data collected by the Contractor and collected from all subcontractors by the Contractor. The data to be collected and submitted includes the following:
 - 11. Contractor name and address
 - 12. Contract number
 - 13. Project name
 - 14. Contract value
 - 15. Reporting period “Beginning Date” through “End Date”
 - 16. Name and registration number of each apprentice by contractor
 - 17. Total number of apprentices and labor hours worked by them, categorized by trade or craft
 - 18. Total number of journeymen and labor hours worked by them, categorized by trade or craft
 - 19. Cumulative combined total of apprentice and journeymen labor hours
 - 20. Total percentage of apprentice hours worked
- D. No changes to the required percentage (%) of apprentice participation shall be allowed without written approval of the Owner. In any request for the change, the Contractor shall clearly demonstrate a good faith effort to comply with the requirements for apprentice participation.
- E. Any substantive violation of the mandatory requirements of this part of the contract may be a material breach of the contract by the Contractor. The Owner may withhold payment pursuant to Part 6.05, stop the work for cause pursuant to Part 3.04, and terminate the contract for cause pursuant to Part 9.01.

10.13 Add Part 10.13 – SPECIAL CONDITIONS

The Owner may have Federal Funding or other special requirements for this project. If applicable, the Contractor will be required to comply with the “DIVISION 00 SPECIAL CONDITIONS” section in the specifications that will be based on the specific requirements of the funding source.

SECTION 002119 – INFORMATION AVAILABLE TO BIDDERS

PART 1 - GENERAL

1.1 REPORTS

- A. Geotechnical Engineering Investigation – Subsurface Exploration, Geologic Hazards, and Preliminary Geotechnical Engineering Report, dated September 27, 2017, prepared by Associated Earth Sciences, Inc., and included herein.

1.2 AVAILABILITY

- A. Copies of these reports are available for purchase from the office of the Bidding Documents printer and distributor. Three (3) days prior notice is required to accommodate printing requests.

- 1. Geotechnical Engineering Investigation is bound herein.

- B. These documents may also be viewed at the office of NAC Architecture.

1.3 PURPOSE

- A. The documents are being made available for “information only.”

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 002119

Contractor Name: _____

**STATE OF WASHINGTON
DEPARTMENT OF ENTERPRISE SERVICES
ENGINEERING & ARCHITECTURAL SERVICES
MAIL TO: PO BOX 41476, OLYMPIA, WA 98504-1476
HAND DELIVER TO: SHIPPING & RECEIVING ROOM NO. 1140
(STOP AT LOBBY FOR DIRECTIONS)
1500 JEFFERSON ST. SE
OLYMPIA, WASHINGTON 98501**

B I D F O R M

In compliance with the contract documents, the following bid form is submitted:

1) BASE BID (Including Trench Excavation Safety Provisions)

_____ \$ _____
(Please print dollar amount in space above) (do not include Washington State Sales Tax)

TRENCH EXCAVATION SAFETY PROVISIONS \$ _____
(Included also in Base Bid)

If the bid amount contains any work which requires trenching exceeding a depth of four feet, all costs for trench safety shall be included in the Base Bid **and indicated above** for adequate trench safety systems in compliance with Chapter 39.04 RCW, 49.17 RCW and WAC 296-155-650. Bidder must include a lump sum dollar amount in blank above (even if the value is \$0.00) to be responsive.

2) BID ALTERNATES (Specify whether additive or deductive)

- (1A) Provide Controls System by Andover \$ _____
- (1B) Provide Controls Sytem by Johnson Controls \$ _____
- (2) Add DAS System \$ _____
- (3) Add Lane Widening \$ _____
- (4) Pave Employee Parking Lot \$ _____

Do not include Washington State Sales Tax **in alternate amounts.**

The Owner reserves the right to accept or reject any or all bid prices within sixty (60) days of the bid date.

3) TIME FOR COMPLETION:

Contractor Name: _____

Contract Time - The undersigned hereby agrees to Substantially Complete all the work under the Base Bid (and accepted Alternates) within 480 calendar days after the date of Notice to Proceed. The Contract Time includes an initial 30 calendar day pre-construction period to facilitate required background checks and identification badging.

Final Completion – All the Work shall be fully and finally completed in accordance with the contract documents within 60 calendar days after the date of Substantial Completion.

4) UNIT PRICES (Where applicable) (Do not include Washington State Sales Tax)

<u>Item No.</u>	<u>Unit Description</u>	<u>Estimated Quantities</u>	<u>Additive Unit Price</u>	<u>Deductive Unit Price</u>	<u>Per Measurement</u>
1. UP-1	Unsuitable Soil	250 CY	\$	\$	
2. UP-2	Structural Fill	250 CY	\$	\$	
3. UP-3	Structural Fill	50 CY	\$	\$	

(Addendum 1)

The above unit prices shall be for any additive and deductive work within 15% of the above estimated quantities. The unit price shall include full compensation for the cost of labor, materials, equipment, overhead, profit and any additional costs associated with the unit bid.

The Owner reserves the right to accept or reject any or all unit prices within sixty (60) days of the bid date. Unit prices not accepted within 60 days of the bid date are rejected.

5) SUBCONTRACTOR LISTING – RCW 39.30.060

If the base bid and the sum of the additive alternates is one million dollars or more, the Bidder shall provide names of the subcontractors with whom the Bidder will **directly** subcontract for performance of the following work. If the Bidder intends to perform the work, the Bidder must enter its name for that category of work.

The Bidder shall not list more than one subcontractor for each category of work identified UNLESS subcontractors vary with bid alternates, in which case the Bidder must indicate which subcontractor will be used for which alternate.

Failure of the Bidder to submit the NAMES of such subcontractors or to name itself to perform such work shall render the Bidder’s bid nonresponsive and, therefore, VOID.

<u>Designated Work</u>	<u>Firm Name</u>
1. <u>HVAC</u> _____	_____
1.a. HVAC Alternate Bid # _____ (if applicable)	
2. <u>Plumbing</u> _____	_____
2.a. Plumbing Alternate Bid # _____ (if applicable)	

Contractor Name: _____

Designated Work

Firm Name

3. Electrical _____

3.a. Electrical Alternate Bid # _____
(if applicable)

Bidder may attach a separate sheet for additional alternate bid subcontractors.

6) APPRENTICESHIP REQUIREMENTS

The apprentice labor hours required for this project are 15% of the total labor hours. The undersigned agrees to utilize this level of apprentice participation.

7) FEDERAL AND STATE REQUIREMENTS

The undersigned agrees to perform the requirements set out and incorporated by reference in attached "DIVISION 00 SPECIAL CONDITIONS" section in the specifications, if applicable.

8) LIQUIDATED DAMAGES

The undersigned agrees to pay the Owner as liquidated damages the sum of \$350.00 for each consecutive calendar day that is in default after the Contract Time. Liquidated damages shall be deducted from the contract invoice after taxes and retainage.

9) RECEIPT OF ADDENDA

Receipt of the following addenda is acknowledged:

Addendum No. _____

Addendum No. _____

Addendum No. _____

Addendum No. _____

Addendum No. _____

Addendum No. _____

Name of Firm _____

NOTE: *If Bidder is a corporation, write State of Incorporation; if a partnership, give full names and addresses of all parties below.*

Signed by _____ Official Capacity _____

Print Name _____

Address _____

City _____ State _____ Zip Code _____

Date _____ Telephone _____ FAX _____

State of Washington Contractor's License No. _____

Federal Tax ID # _____ E-mail address: _____

Employment Security Department No. _____

CONTRACTOR CERTIFICATION
WAGE THEFT PREVENTION – RESPONSIBLE BIDDER CRITERIA
WASHINGTON STATE PUBLIC WORKS CONTRACTS

Prior to awarding a public works contract, the Washington State Department of Enterprise Services is required to determine that a bidder meets the responsibility criteria to be considered a 'responsible bidder' and is qualified to be awarded a public works project. See [RCW 39.04.350\(1\)\(g\) & \(2\)](#). Pursuant to legislative enactment in 2017, the responsibility criteria include a contractor certification that the contractor has not willfully violated Washington's wage laws. See Chap. 258, 2017 Laws (enacting SSB 5301).

Project No.: _____

Project Name: _____

Procurement Solicitation Date: _____

I hereby certify, on behalf of the firm identified below, as follows (check one):

NO WAGE VIOLATIONS. This firm has NOT been determined by a final and binding citation and notice of assessment issued by the Washington Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in [RCW 49.48.082](#), any provision of RCW chapters [49.46](#), [49.48](#), or [49.52](#) within three (3) years prior to the date of the above-referenced procurement solicitation date.

OR

VIOLATIONS OF WAGE LAWS. This firm has been determined by a final and binding citation and notice of assessment issued by the Washington Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in [RCW 49.48.082](#), a provision of RCW chapters [49.46](#), [49.48](#), or [49.52](#) within three (3) years prior to the date of the above-referenced procurement solicitation date.



CERTIFICATE OF
INSURANCE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY.
THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE
COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED (Legal name and business address)	CERTIFICATE HOLDER: STATE OF WASHINGTON	CONTRACT NUMBER
	DEPT. OF ENTERPRISE SERVICES	DATE ISSUED:
	DIVISION OF E&A SERVICES	
	1500 JEFFERSON STREET SE	
	OLYMPIA, WASHINGTON 98501	

PROJECT DESCRIPTION / LOCATIONS / VEHICLES / RESTRICTIONS / SPECIAL ITEMS:

This is to certify that policies of Insurance listed below have been issued to the Insured named above for the policy period indicated.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	Date Policy Effective (MM/DD/YY)	Date Policy Expires (MM/DD/YY)	ALL LIMITS IN THOUSANDS	
	GENERAL LIABILITY <input type="checkbox"/> Commercial General Liability <input type="checkbox"/> Claims Made <input type="checkbox"/> Occurrence <input type="checkbox"/> Owner's & Contractors Protection Deductible \$ _____				General Aggregate	\$ _____
					Products Comp/Ops Aggregate	\$ _____
					Personal & Advertising Injury	\$ _____
					Each Occurrence	\$ _____
					Fire Damage (Any One Fire)	\$ _____
					Medical Expense (Any One Person)	\$ _____
	AUTOMOBILE LIABILITY <input type="checkbox"/> Any Auto <input type="checkbox"/> All Owned Autos <input type="checkbox"/> Scheduled Autos <input type="checkbox"/> Hired Autos <input type="checkbox"/> Non-Owned Autos <input type="checkbox"/> Garage Liability Deductible \$ _____				CSL	\$ _____
					Bodily Injury (per person)	\$ _____
					Bodily Injury (per accident)	\$ _____
					Property Damage	\$ _____
	EXCESS LIABILITY <input type="checkbox"/> Other Than Umbrella Form				Each Occurrence	Aggregate
					\$ _____	\$ _____
	WORKERS COMPENSATION AND EMPLOYER'S LIABILITY				STATUTORY	
					\$ _____	(Each Accident)
					\$ _____	(Disease Policy Limit)
					\$ _____	(Disease-Each Employee)
	OTHER					

ADDITIONAL PROVISIONS

The State of Washington is included as additional insured as related to the above mentioned project.
Should any of the above described policies be cancelled before the expiration date thereof, the issuing Company must deliver or mail not less than a 45 days written notice to the above Certificate Holder, per RCW 48.18.290

COMPANIES AFFORDING COVERAGE		ISSUING COMPANY, AGENT OR REPRESENTATIVE	
NOTE: Attach a separate sheet to this certificate giving all the company names and their percentage of coverage, if clarification is needed,		NAME:	
		ADDRESS:	
Company Letter	A	Authorized Signature	
	B	Title	
	C	Signature Date	
	D	Signee Name	
	E	Telephone No.	

Division 00
Supplemental Bidder
Responsibility Criteria
(With Inclusion Plan and Apprenticeship Requirements)

Low Responsible Bidder

It is the intent of the Owner to award a contract to the lowest responsive and responsible Bidder. In determining the Bidder's responsibility, the Owner shall consider an overall accounting of the items listed below. Potential Bidders may request the Owner modify the Bidder responsibility criteria. The request must be in writing and submitted at least 7 days prior to the bid opening.

The apparent low bidder shall submit the required information within **two (2)** business days of receiving request from Owner. This request may be made in the form of a telephone call or email message. The required information shall be provided on the referenced forms bound herein. Electronic copies may be made available upon request. Failure to submit such information to the satisfaction of the Owner within the time provided may render the Bidder as not responsible.

Required Information/Criteria

For the purposes of the Supplemental Bidder Responsibility evaluation process, the scope of this project generally involves construction of a new Patient Support Services building on an operational psychiatric hospital campus.

1. Experience of Contractor on Projects of Similar Size and Complexity

Contractor is required to have successfully completed at least **five** projects of similar type, size and complexity to this project, each with a contract amount of at least **\$10,000,000** within the last **five** years.

List of Completed Projects (Use Form 1, Contractor Experience Detail)

Provide a list of all the construction contracts **\$10,000,000** and above your firm has completed within the past **10** years, giving the name of the project; name, address, and phone numbers of Owner and architect representatives; final contract amount; date of completion; and percentage of the cost of the work performed with your firm's own forces. This information will be used for reference reviews.

2. Experience of Key Personnel

Experience of Project Manager (Use Form 2, Résumé of Key Personnel for Proposed Contract)

Submit resume and references for the proposed Project Manager. This person shall have managed, as lead project manager, a minimum of **five** projects of similar type, size and complexity to this project, and successfully completed those projects within the last **10** years.

Experience of Superintendent (Use Form 2, Résumé of Key Personnel for Proposed Contract)

Submit resume and references for the proposed project Superintendent. This person shall have performed as the lead Superintendent for a minimum of **five** projects of similar type, size and complexity to this project, and successfully completed those projects within the last **10** years.

3. Diverse Business Inclusion Plan (Use Form 3)

Washington state goals are: Minority Business Enterprise (MBE) 10%, Women’s Business Enterprise (WBE) 6%, WA Small Business 5% and WA Veterans 5%. The apparent low bidder is required to submit a Diverse Businesses Inclusion Plan for all projects with a Maximum Allowable Construction Cost (MACC) over \$1M.

The Diverse Business Inclusion plan shall include the apparent low bidder’s anticipated participation goals, the subcontractors anticipated to be used on this project, a list of diverse businesses near the project, the project’s diverse expert, and past performance using diverse businesses.

4. Apprenticeship (Use Forms 1 & 4)

For each public works project with an apprenticeship utilization goal that was completed by the Bidder within three (3) years of the bid submittal date for this project, the Bidder shall submit the following:

- A list of such projects;
- The owner and contact information for the owner’s representative;
- The apprenticeship utilization percentage goal for the project;
- The actual utilization percentage by the Bidder; and
- An explanation of any extenuating circumstances that contributed to the Bidder not meeting the goals.

(Use Form 4 for projects not listed on Form 1)

The Owner may contact previous owners to validate the information provided by the Bidder and shall consider whether the goals were mandatory or voluntary, and the validity of any explanation of extenuating circumstances.

5. References from Owners and Architects for Previous Projects (Owner uses Form 5, Reference Evaluation Questionnaire)

The Owner may check references by contacting owners and architects of the bidder’s previous projects regarding the bidder’s performance and that of key staff. A reference score sheet will be utilized and the rating shall be satisfactory or better on a five-category scale with “satisfactory” at mid-scale.

Overall Scoring (Form 6, Responsibility Criteria Evaluation Score Sheet)

The Owner will use this form to complete and document the overall evaluation process.

Supplemental Bidder Responsibility Form 1 - Contractor Experience Detail

Project No. 2016-410G (2-1), Western State Hospital New Kitchen Commissary Pharmacy

Business Contact Information

Contractor Name:		Total years in Business:
Mailing Address:		
Business Phone:		Former business name(s) & Dates:
Contact Name and Title:		
Contact Phone:	Contact Email:	Reason for name change(s):

*List Projects Completed Within The Time Specified By Division 00, or Are In Progress							
* Project Name & Location:	Description Of Project:	Owner:	Architect:	Project Manager Name:	Original Contract Amount:	\$	Is this project relevant to proposed project?
					Final Contract Amount:	\$	Yes <input type="checkbox"/> No <input type="checkbox"/>
					Original Contract Days	<input style="width: 40px;" type="text"/>	
		Superintendent Name:	Time Extensions Granted Days	<input style="width: 40px;" type="text"/>			
		Completion Date:	<input style="width: 40px;" type="text"/>				
As Prime <input type="checkbox"/> Or Sub: <input type="checkbox"/>		Address:	Address:				
		Phone:	Phone:				
		Email:	Email:				
<p>1. Did this project require Apprenticeship Participation? Yes <input type="checkbox"/> No <input type="checkbox"/> (If NO, stop here).</p> <p>2. If yes, what was the Apprenticeship %? <input style="width: 40px;" type="text"/> %</p> <p>3. What was the actual % achieved? <input style="width: 40px;" type="text"/> %</p> <p>4. Was the apprenticeship requirement met? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If NO to question 4 attach separate sheet to explain Why.</p>							

Supplemental Bidder Responsibility Form 2 - Resume of Key Personnel for Proposed Contract

Project No. 2016-410G (2-1), Western State Hospital New Kitchen Commissary Pharmacy

Name:	Role in this Contract:	Years Experience	
		Total	With Current Firm
Firm Name and Location (City and State):			
Training/Education/Specialization:			
Years of Experience in the Proposed Role:			

RELEVANT PROJECTS	
Project Title:	Year Completed
Project Owner:	
Brief Description (Brief scope, size, cost, etc.) and specific role:	Check if project performed with current firm. <input type="checkbox"/> If performed with different firm list the firm name
Reference Name & Contact Information:	
Project Owner:	Project Architect:
Name:	Name:
Phone:	Phone:
E-mail	E-mail:

RELEVANT PROJECTS	
Project Title:	Year Completed
Project Owner:	
Brief Description (Brief scope, size, cost, etc.) and specific role:	Check if project performed with current firm. <input type="checkbox"/> If performed with different firm list the firm name
Reference Name & Contact Information:	
Project Owner:	Project Architect:
Name:	Name:
Phone:	Phone:
E-mail	E-mail:

RELEVANT PROJECTS	
Project Title:	Year Completed
Project Owner:	
Brief Description (Brief scope, size, cost, etc.) and specific role:	Check if project performed with current firm. <input type="checkbox"/> If performed with different firm list the firm Name
Reference Name & Contact Information:	
Project Owner:	Project Architect:
Name:	Name:
Phone:	Phone:
E-mail	E-mail:

RELEVANT PROJECTS	
Project Title:	Year Completed
Project Owner:	
Brief Description (Brief scope, size, cost, etc.) and specific role:	Check if project performed with current firm. <input type="checkbox"/> If performed with different firm list the firm Name
Reference Name & Contact Information:	
Project Owner:	Project Architect:
Name:	Name:
Phone:	Phone:
E-mail	E-mail:

RELEVANT PROJECTS	
Project Title:	Year Completed
Project Owner:	
Brief Description (Brief scope, size, cost, etc.) and specific role:	Check if project performed with current firm. <input type="checkbox"/> If performed with different firm list the firm Name
Reference Name & Contact Information:	
Project Owner:	Project Architect:
Name:	Name:
Phone:	Phone:
E-mail	E-mail:

**Supplemental Bidder Responsibility
Form 3 - Prime Contractor Diverse Business Inclusion Plan
Project No. 2016-410G (2-1), Western State Hospital New Kitchen Commissary Pharmacy**

Prime Contractor Name: _____

For the purposes of this form, Washington State-certified diverse businesses are defined as follows:

- *Minority Business Enterprise (MBE), Women’s Business Enterprise (WBE), or combination of the two.* Certified by the Office of Minority and Women’s Business Enterprises (OMWBE): <http://omwbe.wa.gov/>
- *Veteran-owned Business.* Certified by the Department of Veteran’s Affairs (DVA): <http://dva.wa.gov/>
- *Small Business* (includes Mini and Micro businesses). Certified through the Washington Electronic Business Solution (WEBS): <https://fortress.wa.gov/ga/webs/home.html>

Anticipated Certified Diverse Business Participation Goals

Subcontracting means direct performance of commercially useful work through subcontracting as part of the proposed project team. Of the total contract work, what are the diverse business participation goals proposed for subcontracting on your team? Please only include the above-listed Washington State certification types in your “Contractor-defined Anticipated Percent of Contract Amount (Goals)” estimate.

Anticipated Certified Diverse Business Participation Goals	Washington State Goals	Contractor-defined Anticipated Percent of Contract Amount (Goals)
Minority-owned business (MBE)	10%	%
Women-owned business (WBE)	6%	%
Veteran-owned business (DVA)	5%	%
Small business	5%	%

Subcontracting Team

List the names of the diverse businesses you anticipate using on this project. Generally describe the work you expect the diverse business to perform and identify the percent of total contract value intended for each diverse business. Please include the above-listed Washington State certification types. *If necessary, add more rows below.*

Name of Diverse Business	Specify Diverse Business Certification (circle one or more)	Describe Trade or Task	Anticipated Percent of Contract Amount
	MBE, WBE, DVA, Small		%
	MBE, WBE, DVA, Small		%
	MBE, WBE, DVA, Small		%
	MBE, WBE, DVA, Small		%
	MBE, WBE, DVA, Small		%

Attach a list of diverse businesses near the project location to this form:

1. Go to <http://omwbe.wa.gov/directory-of-certified-firms/>
2. Click on “OMWBE DIRECTORY”
3. Enter a City, Zip Code, or County near the project site address and then press “Search” at the bottom of the page. If you do not have many results, please expand your search to include nearby locations.
4. Print and attach the results to this form with your submittal

Diverse Expert:

Diverse Expert responsibilities would typically include, but are not limited to:

- Outreach to qualified diverse businesses.
- Submit and discuss updates on a regular basis to the state project manager regarding Diverse Business utilization and progress.
- Ongoing outreach to diverse businesses for required contract work, including any changes in scope.

- Assist diverse businesses with successful contract performance.

A qualified Diverse Expert brings knowledge of the identity, capabilities and capacities of diverse business subcontractors and suppliers; experience recruiting and working with diverse businesses for construction; and assisting diverse businesses to develop working relationships with contractors.

Identify the person within your team to manage your diverse inclusion responsibility.

Diverse Expert Name: _____

Diverse Expert Contact Information: _____

Diverse Expert Firm (if another firm is managing participation): _____

Past Performance

Please select **five (5) of your projects** with Washington State-certified diverse business participation (MBE, WBE, DVA, and/or Small/Mini/Micro) and list them below **for the last five (5) years**. If you do not have any projects that tracked or reported diverse business participation, you may leave this section blank. In that case, please attach an additional sheet with explanation.

You may have projects with diverse business participation for an organization or entity that required *different* diverse business categories (including self-certification). If so, please attach a sheet with the same column data and information, but include percentages for the categories that were tracked during the project.

Contract Name	Contracting Agency or Entity	Contract Amount	Year	Percent of Contract Amount	
				Minority-owned business:	%
				Women-owned business:	%
				Veteran-owned business:	%
				Small/mini/micro business:	%
Contract Name	Contracting Agency or Entity	Contract Amount	Year	Percent of Contract Amount	
		\$		Minority-owned business:	%
				Women-owned business:	%
				Veteran-owned business:	%
				Small/mini/micro business:	%
Contract Name	Contracting Agency or Entity	Contract Amount	Year	Percent of Contract Amount	
		\$		Minority-owned business:	%
				Women-owned business:	%
				Veteran-owned business:	%
				Small/mini/micro business:	%
Contract Name	Contracting Agency or Entity	Contract Amount	Year	Percent of Contract Amount	
		\$		Minority-owned business:	%
				Women-owned business:	%
				Veteran-owned business:	%
				Small/mini/micro business:	%
Contract Name	Contracting Agency or Entity	Contract Amount	Year	Percent of Contract Amount	
		\$		Minority-owned business:	%
				Women-owned business:	%
				Veteran-owned business:	%
				Small/mini/micro business:	%

Supplemental Bidder Responsibility
Form 4 - Apprenticeship Utilization (In addition to Form 1)
Project No. 2016-410G (2-1), Western State Hospital New Kitchen Commissary Pharmacy

Business Contact Information

Contractor Name:		Total years in Business:
Mailing Address:		
Business Phone:		Former business name(s) & Dates:
Contact Name and Title:		
Contact Phone:	Contact Email:	Reason for name change(s):

* Project Name & Location:	Description Of Project:	Owner:	Architect:	Project Manager Name:	Original Contract Amount:	\$
		Address:	Address:		Final Contract Amount:	\$
		Phone:	Phone:		Completion Date:	<input style="width: 50px;" type="text"/>
		As Prime <input type="checkbox"/> Or Sub: <input type="checkbox"/>		Email:	Email:	Superintendent Name: 1. Did this project require Apprenticeship Participation? Yes <input type="checkbox"/> No <input type="checkbox"/> (If NO, stop here). 2. If yes, what was the Apprenticeship %? % 3. What was the actual % achieved? <input style="width: 50px;" type="text"/> % 4. Was the apprenticeship requirement met? Yes <input type="checkbox"/> No <input type="checkbox"/> If NO to question 4 explain Why .

Supplemental Bidder Responsibility Form 5 - Reference Evaluation Questionnaire

Project No. 2016-410G (2-1), Western State Hospital New Kitchen Commissary Pharmacy

Evaluated Firm :
Project Manager:
Superintendent:
Evaluated Project Name:

- Prime
 Subcontractor

Approx. Start Date	Approx. End Date	Approx. Final Project Cost

PERFORMANCE EVALUATION

Rating Criteria - Rate on a scale of 1 to 5

- **5 = Superior** based on performance (would hire this firm/individual again)
- **4 = More than Satisfactory**
- **3 = Satisfactory** based on performance (would hire this firm/individual again)
- **2 = Less than Satisfactory**
- **1= Totally Unsatisfactory** based on performance (would never hire the firm/individual again)

#	Criteria	Rating		
		Company	PM	Super
1	Ability to meet client's expectations			
2	Quality of workmanship			
3	Ability to manage project costs and minimize change orders			
4	Ability to maintain project schedule			
5	Ability to manage subcontractors			
6	Professionalism, leadership and communication in issues management (RFI, shop drawing submittal, timely resolution of issues/questions)			
7	Ability to follow the owner's rules, regulations, and requirements (housekeeping, safety, etc.)			
8	Ability to manage closeout process (Prompt submittal of punch list, warranty, as-builts, operation manuals, tax clearances, etc.)			
9	Comfort level in hiring firm or individual again based on performance			
Total Score				
Average Score				

Evaluator Information	
Name of Evaluator:	Title:
Firm/Company Name:	
Firm Address:	
Phone:	Email:

Form 6 – Supplemental Responsibility Criteria Evaluation Score Sheet

Project Title	Western State Hospital New Kitchen Commissary Pharmacy
Project Number	2016-410G (2-1)
Project Manager	Penny Koal, AIA, LEED AP
Project Location	Western State Hospital, 9601 Steilacoom Blvd., Lakewood, WA
Project Owner	Department of Social and Health Services

1. Experience of Contractor - On projects of similar size & complexity (Form 1)	Pass or Fail
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2. Experience of Key Personnel (Form 2)	
Superintendent	Pass or Fail
Project Manager	Pass or Fail
Other(s) if specified in Division 00	Pass or Fail

3. Diverse Business Inclusion Plan (Form 3) <i>(Applies only to projects with Diverse Business Plan Inclusion requirements; i.e. MACC over \$1M)</i>	Pass, Fail, or N/A
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4. Contractor Compliance with Apprenticeship Requirements - Requirements were met or if not, a good faith effort was demonstrated (Forms 1 & 4) <i>Applies only to projects with apprenticeship participation requirements; i.e. MACC over \$1M</i>	Not Scored
--	------------

5. References from Previous Projects (Form 5) Evaluate contractor's references information and using the rating numbers: 1 = NOT Satisfactory (requires a written comment below) 2 = Less THAN Satisfactory 3 = Satisfactory 4 = More THAN Satisfactory 5 = Superior	Rating Score 1-5 (3 is Satisfactory)
Company	
Project Manager	
Superintendent	
Total Score:	
Average score (divide total score by number of ratings)	

In determining the bidder responsibility, an overall accounting of the ratings shall be made. A score of "Pass" is required for categories 1 - 4 and an average score of 3.0 or higher is required to meet the minimum Supplemental Bidder Responsibility requirements.

Comments _____

Determination Responsible
 Not Responsible (Preliminary Determination)

Evaluated by _____ Date _____
 E&AS PM (Typed or Printed Name)

 Signature

SECTION 007400 - PREVAILING WAGE RATES**1.1 PREVAILING WAGE RATES**

A. The following prevailing wage rate information is provided in accordance with RCW 39.12.030:

1. Pursuant to RCW 39.12, no worker, laborer, or mechanic shall be paid less than the “prevailing rate of wage” in effect on the Bid Date.
2. Prevailing wage rate information for journeymen and apprentices is available at the Washington State Department of Labor and Industries website at www.lni.wa.gov/tradeslicensing/prevwage.
3. The project is located in Pierce County.

B. Prevailing Wage Rates shall be posted in a conspicuous place or location on the jobsite per RCW 39.12 and Labor and Industries requirements.

END OF SECTION 007300

SECTION 011100 - SUMMARY OF WORK

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 PROJECT/WORK IDENTIFICATION

- A. The Project name is Western State Hospital New Kitchen Commissary Pharmacy.
- B. Project Location is 9601 Steilacoom Blvd., Lakewood, WA 98498.
- C. The Owner is Washington State Department of Social and Health Services.
- D. Contract Documents are dated January 9, 2018 and were prepared by NAC Architecture, Inc.
- E. The Work includes provisions for all supplies, tools, equipment, scaffolding, transportation, utilities, services, superintendence, and labor, and the furnishing of all materials, items, and accessories needed for the total construction of the project in strict conformance with the Contract Documents and to deliver to the Owner complete, operating patient services facility suitable to support operations at a secure psychiatric hospital.
- F. The Work will be constructed under a single prime contract.
- G. Summary:
 - 1. The Work consists of constructing a new, approximately 48,000 square foot, steel-framed patient services building to be constructed on a site where a building was previously demolished. Previous building was abated and demolished in 2003 and was known as North Hall, Building 7.
 - 2. The Contractor shall understand that this work also includes clearing, grubbing, grading and temporary storm water drainage/control, along with items as noted in the contract documents.
 - 3. The intent of the Contract Documents is that the Contractor will construct a complete, new, fully functional building, related on-site improvements and utility connections, including all civil, architectural, structural, mechanical and electrical improvements, with all materials and equipment in place and all systems operative as defined by the contract documents.
- H. Work also includes, but is not limited to:
 - 1. Coordination/cooperation with other contractors/owner's agents which may be working concurrently on other portions of the site during the project period.
 - 2. Obtaining and paying for use of additional storage, parking or work areas needed for operations.

3. Controlling all movement of water on project site and performing all necessary protection of soils, to prevent erosion of soils, over-saturation of soils, downstream erosion and runoff, etc.
4. Contractor is responsible for controlling dust from leaving site according to all governmental requirements.
5. Coordination/cooperation with other contractors which may or may not be working concurrently on the campus on related projects not delineated within the bounds of this contract.

1.3 SUSTAINABLE DESIGN AND CONSTRUCTION

- A. A primary goal for the Owner is to promote and carry out sustainable design and construction on the project.
 1. Sustainable design and construction is defined as the materials and methods that preserve landscape, conserve energy, use materials efficiently, enhance environmental quality, and safeguard water.
 2. Sustainable design and construction will be evaluated by the US Green Building Council through fulfillment of a LEED Rating for the Project. The Owner requires a LEED Silver Rating for the Project.
- B. The Contractor is encouraged to research and select materials, building systems, methods and construction procedures that provide the greatest use of recycled materials, environmentally safe building materials and construction technologies, and to enhance energy efficiency.

1.4 CONTRACTOR USE OF PREMISES

- A. General: During the construction period, the Contractor will be working in an occupied and operational secure psychiatric facility. The Contractor shall make themselves familiar with hospital construction limitations and procedures.
- B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
 1. Do not unreasonably encumber the site with materials or equipment. If additional storage is necessary obtain and pay for such storage off site.
 2. Use of the site does not cover use of adjacent right of ways, public or private property. Consult local jurisdictions or landowners where use of property under their control is considered necessary and conform to their requirements for use thereof.
 3. Contractor shall secure all construction areas and activities as necessary to prevent access by the public, staff and patients.
 - a. Note that while the project site is located outside the secure patient perimeter, some patients may be encountered outside this perimeter.

1.5 SPECIAL PROVISIONS FOR WORKING AT WESTERN STATE HOSPITAL

- A. Special attention should be paid to Division 01 Section "Special Provisions" for requirements for working on the campus, required personnel background checks, and other requirements for working at a secure psychiatric hospital.

1.6 CONSTRUCTION WORK HOURS

- A. Per the City of Lakewood Municipal Code 8.36.010 (B) (8), sounds originating from construction sites, including but not limited to sounds from construction equipment, power tools and hammering are prohibited between the hours of 10:00 p.m. and 7:00 a.m. on weekdays and 10:00 p.m. and 9:00 a.m. on weekends.
 - 1. The Hospital operates as an around-the-clock, 24/7 inpatient psychiatric institution. Construction noise shall be limited to between the hours of 7:00 a.m. and 7:00 p.m. weekdays and between 9:00 a.m. and 6:00 p.m. on weekends.

1.7 RELATED WORK BY OWNER OR OTHERS

- A. NIC & FOIO Items: Items designated on the Drawings and/or described in the Specifications as "NIC" (Not in Contract) or "FOIO" (Furnished by Owner and Installed by Owner) are not included in the Contract.
- B. Contractor's Responsibilities for NIC & FOIO Items:
 - 1. Designate delivery date for each portion of the Work in the Progress Schedule.
 - 2. Storage of products as required.
 - 3. Coordinate installation with the Progress Schedule.
 - 4. Provide all preparatory work necessary for proper installation including blocking and backing and finish work including caulking, grouting, furring, preparation of subfloors, and painting adjacent surfaces as required for NIC or FOIO equipment.
 - a. Notify the Owner 21 days prior to disconnection and/or removal of existing equipment that are to be relocated from existing locations on the campus.

1.8 OWNER FURNISHED PRODUCTS

- A. OFCI Items: Items designated on project Drawings and/or described as "OFCI" (Owner Furnished and Contractor Installed).
- B. Owner's Responsibilities for OFCI Equipment:
 - 1. Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
 - 2. Deliver supplier's bill of materials to Architect for review.
 - 3. Arrange and pay for delivery to site in accordance with Progress Schedule.
 - 4. Inspect deliveries jointly with Contractor.

5. Submit claims for transportation damage.
6. Arrange for replacement of damaged, defective, or missing items.
7. Arrange for manufacturers' field services; arrange for and deliver manufacturers' warranties and bonds to Contractor.

C. Contractor's Responsibilities for OFCI Equipment:

1. Designate submittals and delivery date for each product in Progress Schedule.
2. Review shop drawings, product data, samples, and other submittals. Submit to Architect with notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
3. Receive and unload products at site.
4. Inspect deliveries jointly with Owner, record shortages and damaged or defective items.
5. Handle products at site, including uncrating and storage.
6. Protect products from damage and from exposure to elements.
7. Assemble, install, connect, adjust, and finish products as stipulated in respective specification sections.
8. Coordinate installation inspections required by public authorities.
9. Clean, repair, or replace items damaged by Contractor.
10. Remove and dispose of crating and packing materials for Owner-furnished materials and equipment delivered to the site.

1.9 VENDOR FURNISHED PRODUCTS

A. OFVI Items: Items designated on the Drawings and/or described in the Specifications as "OFVI" (Owner Furnished and Vendor Installed) are not included in the Contract, but require coordination by the Contractor for rough-in and installation.

B. Contractor's Responsibilities for OFVI Equipment:

1. Designate submittals and delivery date for each product in Progress Schedule.
2. Review shop drawings, product data, samples, and other submittals. Submit to Architect with notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
3. Receive and unload products at site.
4. Inspect deliveries jointly with Owner, record shortages and damaged or defective items.
5. Handle products at site, including uncrating and storage.
6. Protect products from damage and from exposure to elements.
7. Coordinate final installation of equipment and components with vendors.

1.10 CONTRACTOR DESIGNED ELEMENTS

A. Where work of this Contract requires Contractor design, Contractor shall comply with following requirements.

1. Submit Shop Drawings and calculations to Architect for review.

2. Submit Shop Drawings and calculations to governing agencies for approval and permits.
3. All Shop Drawings and calculations shall be stamped by a registered architect or engineer licensed in State of Washington.

1.11 OWNER OCCUPANCY

- A. The site is currently vacant land and an existing parking lot. The Owner will coordinate with the Contractor for access to work areas; however the Contractor will have full responsibility for securing all areas disturbed by construction activities.

1.12 ALTERNATE BID ITEMS

- A. The Contractor is to note that the included Alternate Bid items add to the scope of work to be performed. All trades and all divisions of this specification that are affected by the alternate bid items shall be included in the project.

1.13 CONSTRUCTION PHASING GENERAL REQUIREMENTS

- A. It is intended the work be completed in a single phase.
 1. A four-story concrete and brick ward building was previously located on the project site. The Contractor may encounter limited amounts of small debris during earthwork activities. Notify the Architect if significant debris are encountered.

1.14 CONSTRUCTION COMPLETION DATES

- A. The Work shall be Substantially Complete as indicated on the Bid Proposal form.

1.15 WARRANTIES

- A. All warranties for the work shall begin as specified in the General Conditions.

1.16 ALTERATIONS AND COORDINATION

- A. General: The work of this Contract includes coordination of the entire work of the project, including preparation of general coordination drawings, diagrams and schedules, and control of site utilization, from beginning of construction activity through project close-out and warranty periods. All requests for information shall be submitted through the General Contractor on a form provided by, or approved by, the Owner and the Architect.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011100

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION

- A. This Section includes Allowances incorporated in the Base Bid to address the cost of specific items of work, of unknown quantities at time of Bid, that are likely to be required as a result of the discovery of hidden yet anticipated conditions. The Allowance for each item scheduled herein shall be the product of the Unit Price for that item and the quantity specified herein.
- B. Related Sections:
 - 1. Division 01 Section "Unit Prices."
 - 2. Division 01 Section "Submittal Procedures."
 - 3. Division 01 Section "Schedule of Values."
- C. Allowances are provided to address hidden conditions only, and are in addition to any and all other work shown on the Drawings or otherwise indicated or implied by the Contract Documents. Allowances, or portions thereof, not used, documented and verified shall be credited to the Owner, by Change Order, following Substantial Completion of the project.
- D. Provide Allowances for the Work described herein.

1.3 UNIT PRICE ALLOWANCES

- A. Costs included in Allowance:
 - 1. Refer to Division 01 Section "Unit Prices" for included costs.
- B. Verification of Quantities
 - 1. Contractor, Architect/Engineer and Owner shall verify and certify all quantities provided as part of each Allowance. Payment shall be made only for those quantities that exceed the Allowance and have been verified and certified by all parties.
- C. Architect/Engineer Responsibilities:
 - 1. Prepare Change Orders: In the event that quantities specified in the Allowances are exceeded, the A/E shall prepare Change Orders for an amount determined by the excess quantity and the Unit Price, as previous verified and certified. Following Substantial Completion of the Project, all Allowances will be

reconciled with respect to specified and actual quantities, with any outstanding costs and/or credits incorporated in a Change Order.

D. Contractor Responsibilities:

1. Include stipulated Allowances as part of Base Bid.
2. Submit Shop Drawings, Product Data and Samples in accordance with Division 01 Section "Submittal Procedures."
3. Schedule of Values: Provide individual line items for each Allowance, or each category of Allowances when the two or more Allowances pertain to the same Specification Section and the work is performed by the same contractor or subcontractor.
4. Allowance Log: Contractor shall maintain an Allowance Log. Log shall list each Allowance, corresponding Unit Price and specified quantity, and documentation of units of work expended. Documentation shall be by occurrence and "to date." Space shall be provided for verification and certification by Contractor and A/E. Log shall be distributed and discussed at each weekly meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF UNIT PRICE ALLOWANCES

- A. The value of a Unit Price Allowance shall be equal to its specified quantity times its associated Unit Price.
- B. Allowance UPA-1: Excavation and Off-site Disposal of 250 Cubic Yards of Unanticipated Unsuitable Soil:
 1. The Contractor shall include in its Base Bid all costs associated with the excavation and off-site disposal off 250 cubic yards of unanticipated, unsuitable soil as an Allowance over and above all other Work identified in or reasonably inferred by the Contract Documents.

- C. Allowance UPA-2: Import and Place 250 Cubic Yards of Structural Fill:
1. The Contractor shall include in its Base Bid all costs required to import and place 250 cubic yards of structural fill material as an Allowance over and above all other Work identified in or reasonably inferred by the Contract Documents.
- D. *Allowance UPA-3: Import and Place 50 cubic yards of CDF (controlled density fill)*
1. *The Contractor shall include in its Base Bid all costs required to import and place 50 cubic yards of controlled density fill as an Allowance over and above all other Work identified in or reasonably inferred by the Contract Documents. (Addendum 1)*

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION

- A. This Section includes administrative and procedural requirements pertaining to Unit Prices
- B. See Division 01 Section "Allowances" for administrative and procedural requirements for the monitoring, documentation and reconciliation of Allowances determined by Unit Prices, and for the Schedule of Unit Price Allowances.
- C. Provide Unit Prices for the Work described herein.

1.3 QUALITY ASSURANCE

- A. For each Unit Price item that is performed or provided, coordinate the Work of the various trades involved, and modify surrounding Work as required to complete the project, as intended.
- B. Submittals for Unit Price Items shall comply with requirements of Division 01 Section "Submittal Procedures."
- C. See Division 01 Section "Quality Requirements" for general inspection requirements.
- D. If there are questions regarding the extent, scope, nature or intent of Unit Price Work, contact the Architect for clarification. Failure on the part of the Contractor to clarify any unclear items shall not relieve the Contractor of the responsibility for performing the Work in accordance with the intent and requirements of the Contract Documents.

1.4 DEFINITIONS

- A. A Unit Price is an amount proposed by Bidders and stated on the Bid Form, as a price per unit of measurement for materials added to or deducted from the Base Bid by appropriate modification, if the quantities of Work required by the Contract Documents are increased or decreased. These same Unit Prices shall be used to determine Allowances included in the Base Bid, and subject to reconciliation following Substantial Completion of the Project. The unit prices shall be in effect for all additional material required to be added, or deducted from, the Allowance included in the Base Bid.
- B. Unit Prices shall include all labor, material, equipment, overhead, profit, coordination and supervision to complete all the work. Do not include applicable State and Local Sales Taxes, but include all other taxes including, but not limited to, income, excise, and business and occupation taxes.

1.5 PROCEDURES

- A. Unit Prices include, but are not limited to, all necessary material, plus cost for delivery, installation, special equipment, temporary facilities and applicable taxes, except sales tax.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections. If not noted, measurement is to be of units in place as noted in this Section. Owner has the right to reject Contractor measurements and to have an independent agent, acceptable to both parties, verify quantities.
- C. The "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The applicable Sections of the Specifications, and requirements noted on the drawings, apply to the Work under each Unit Price item.

PART 3 - EXECUTION

- A. For Unit Prices UP-1 and UP-2: Excavation, material handling, import of structural fill, and disposal of native soil required to establish the planned subgrade elevations shall be included in the base scope of work and is not compensable as a Unit Price. Unanticipated excavation of unanticipated, unsuitable soil below planned subgrades and importing, placement, and compaction of structural fill for approved over-excavation areas will be tracked by the Geotechnical Engineer and stated in the Geotech site reports. Contractor shall review with Geotechnical Engineer all material quantities at the time the materials are handled, and quantities stated in the Geotechnical Engineer's site reports shall be presumed to be accurate and correct.
- B. All unanticipated work must have a geotechnical engineer present to verify the scope of the condition. At the end of each day the quantities of each Unit Price will be verified by the geotechnical engineer and reported in the daily geotechnical site reports.
- C. Unit Price No. UP-1: Excavation and Off-Site Disposal of Unanticipated Unsuitable Soil:
 - 1. Description: The cost to provide additional excavation, material handling and off-site disposal of un-anticipated, unsuitable native soils below the planned subgrade elevations as directed by the owner's Geotechnical Engineer. This excavation, material handling and disposal is in addition to that required by the Scope of Work described in the Contract Documents.
 - 2. Unit of Measurement: Cubic Yard (CY) of soils excavated, trucked and legally dumped off site, measured from its original compacted and in-place location ("Bank Yards").
 - 3. Unit Price No. UP-1 shall be applied to Unit Price Allowance UPA-1.

D. Unit Price No. UP-2: Import and Place Structural Fill:

1. Description: The cost to provide additional imported structural fill, supplied, placed and compacted to replace unsuitable, unanticipated over-excavated materials compensated in Unit Price UP-1 or as otherwise designated by the Geotechnical Engineer. Structural Fill is according to Division 31 Section "Earthwork," as required in addition to that required in the Scope of Work.
2. Unit of Measurement: Cubic Yard (CY) in final place of fill imported, placed and compacted ("Bank yards) as measured by on site Geotechnical inspector.
3. Unit Price No. UP-2 shall be applied to Unit Price Allowance UPA-2.

E. Unit Price No. UP-3: Additional Earthwork Imported CDF:

1. Amount: To be the Extended Price as listed on the Contractor's Bid Form for this Unit Price.
2. Contractor shall include in the Base Bid amount an allowance for unanticipated imported CDF that is beyond the scope defined in the contract documents and shall be delivered to the site, placed and compacted in place in a manner defined in the specification and as directed by the geotechnical Engineer.
3. Unit of Measurement: Cubic Yard (CY) in final place of fill imported, placed and compacted ("Bank yards) as measured by on site Geotechnical inspector.
4. The value of Allowance UPA-3 shall be calculated by multiplying the value of Unit Price UP-3 by the quantity of 50 cubic yards as listed on the bid form.

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates.

1.3 DEFINITIONS

- A. Definition: An Alternate is an amount proposed by bidders and stated on the Bid Proposal form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each Alternate is the net addition to, or deduction from, the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
 - 1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.
- B. Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each Alternate. Indicate whether Alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to Alternates.
- C. Execute accepted Alternates under the same conditions as other Work of this Contract.
- D. Schedule: A non-Technical Description "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each Alternate.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The applicable Sections of the Specifications, and requirements noted on the drawings, apply to the Work under each Alternate item.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1A – Provide Controls System by Andover
 - 1. Description: Provide integrated automation building controls per specification Division 25 from Andover Continuum Building Automation.
- B. Alternate No. 1B – Provide Controls System by Johnson Controls.
 - 1. Description: Provide integrated automation building controls per specification Division 25 from Johnson Controls
- C. Alternate No. 2 – Add DAS System
 - 1. Description: Add a Distributed Antenna (DAS) Emergency Responder System per specification Division 26
- D. Alternate No. 3 – Add Lane Widening
 - 1. Description: Add lane widening as shown in the project drawings and per specification Division 32
- E. Alternate No. 4 – Pave Employee Parking Lot
 - 1. Description: Add paving of employee parking lot as shown in the project drawings and per specification Division 32.

END OF SECTION 012300

SECTION 012500 - PRODUCT SUBSTITUTIONS & OPTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Furnish and install products in accordance with options and conditions for substitutions stated in this Section.

1. Where specified only by performance or reference standards, select a product meeting standards by any Manufacturer.
2. Where specified by naming several products or Manufacturers, select any product and Manufacturer named.
3. Where specified by naming one or more products, but indicating "or approved" or similar wording after specified listing, select specified product or submit Request for Product Substitution on attached form.
4. Where specified by naming only one product and Manufacturer, there is no option, and no substitution will be allowed.

B. Substitutions

1. Prior to Bid Date, submit Request for Product Substitution to Architect:
 - a. Two (2) copies of each form if submitted in hard copy
 - b. Electronic submittals are preferred.
 - c. Submit seven (7) days minimum prior to scheduled Bid Date.
 - d. Accepted substitutions will be acknowledged by Addenda.
2. After Contract date the Owner may, at their option, consider certain other substitutions submitted in accordance with requirements of this Section. Indicate one or more of the following reasons for request.
 - a. Substitution is required for compliance with final code interpretation requirements, or insurance regulation.
 - b. Specified product is unavailable through no fault of Contractor.
 - c. Subsequent information discloses specified product unable to perform properly or fit designated space.
 - d. Manufacturer or fabricator refuses to certify or guarantee performance of specified product, as required.
 - e. Substitution saves substantial cost, time. (Submit accurate cost and/or time data for proposed substitution in lieu of product specified.)

3. In making request for Substitution, Manufacturer/Contractor represents:
 - a. It has personally investigated proposed product and, in his opinion, it is equal or superior in all respects to that specified.
 - 1) Substantiate whenever requested by Architect.
 - b. It will coordinate installation of accepted substitution into the Work and guarantees to complete it in all respects.
 - 1) It has identified any and all changes, if any, required to other portions of the Work as a result of the proposed product.
 - c. It will provide the same or an improved guarantee for the proposed substitution as for the specified product.
 - d. It waives all claims for additional costs related to the proposed substitution that consequently become apparent.
 - e. It agrees to pay all of the Owner's additional costs related to the proposed substitution that consequently become apparent, such as redesign expenses, utility and service relocations, etc.
 - f. Cost data is complete and includes all related costs under its Contract, but excludes:
 4. Cost under separate Contractors. (Show impact on attached Form).
 5. Design Consultants' redesign, unless designated.
 6. Substitutions will not be considered if:
 - a. They are indicated or implied on Shop Drawings or other submittals without proper submittal on attached Form.
 - b. Acceptance will require substantial revisions of Contract Documents.
 7. Contractor shall pay Architect and his Consultants for time required to review substitutions, if requested.
 8. Architect is sole judge of suitability of substitution and decision is final.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012500



Substitution Request Form

To*	NAC Architecture	Project	WSH New Kitchen Commissary Pharmacy		
		Date			
		NAC No.	121	- 16004	- 09C

* Please send Mechanical and Electrical requests directly to the Consultant.

1. We hereby submit for your consideration a substitution for the following specified item for the above project.

Item currently specified (Use Alt + Enter to create new lines.)

Spec Section	Page	Line/Paragraph

2. Proposed Substitution (Use Alt + Enter to create new lines.)

3. Reason for Substitution (Use Alt + Enter to create new lines.)

4. Attach complete technical data, catalog cuts, Drawings, samples, etc. Exact models and description of products shall be noted with any deviation noted.

5. Include complete information on changes to Drawings, and/or Specifications which proposed substitution will require for its proper installation.

6. The substitute affects dimensions shown on Drawings (affirmative indicated by a check mark).

6a. If so (checked), how?

7. The substitute adds cost to the Owner (affirmative indicated by a check mark).

7a. If so (checked), approximately how much?

8. Describe the effect substitution has on other trades.

9. Describe differences between proposed substitution and specified item.

10. Manufacturer's warranties of the proposed and specified items are Same Different (explain on attachment)



012501-COMMENT SubstitutionRequestForm.xlsm

Substitution Request Form

Submitted By

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item. The undersigned agrees to pay for changes to the building and systems design, including engineering and detailing costs caused by the requested substitution.

Signature

Company

Address

City State ZIP

Phone Fax Email

Please check if there are attachments

For Reviewer

- Approved for Bidding subject to review and approval of Submittals (and as noted below)
- Rejected - Inadequate Information
- Not Accepted
- Received Too Late

By Date

Remarks

(Use Alt + Enter to create new lines.)



SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 GENERAL

- A. Changes to and/or clarifications of the Work may be initiated by a Request for Information (RFI), Architect's Supplemental Instruction (ASI), Construction Field Authorization (FA), or a Change Order Proposal (COP).
- B. A monetary change to the Contract Sum is only implemented by a Change Order (CO).

1.3 DOCUMENTATION OF COSTS

- A. Unit prices noted on the Bid Form shall include all overhead, profit and related costs. Adjustments shall be made in accordance with General Conditions. The Contractor shall document quantities used.
- B. All actual or proposed costs, whether initiated by a Change Order Proposal or Construction Field Authorization, shall be summarized on forms provided by Owner, with all necessary substantiating documentation attached thereto.
- C. The Owner reserves the right to request notarized time sheets, invoices and other documentation as necessary to protect the public interest.

1.4 CHANGES TO CONTRACT TIME

- A. The Contractor shall make every effort to comply with the Contract Dates of Substantial and Final Completion.
- B. The Contractor may not make claim for costs or losses associated with the use of float time, if any, between anticipated completion dates and the Contract Dates of Substantial and Final Completion.
- C. Only impacts on critical path activities which can be documented as delaying the Contract Date of Substantial Completion shall be considered for changes to the Contract Time.

1.5 REQUEST FOR INFORMATION (RFI)

- A. Prepared by Contractor and distributed to Owner and Architect.
- B. Form provided by Owner or Architect.
- C. Response provided by Architect.

- D. Distributed by Architect following Owner's acceptance.
- E. Contractor must either:
 - 1. Proceed upon receipt of response if no cost impact, or,
 - 2. Submit a statement of cost impact within 7 days of receipt of response.
 - a. If cost impact is justified, Architect shall issue a FA and/or COP.
 - b. If cost impact is not justified, Architect will issue a Notice to Proceed, directing the Contractor to proceed with the Work in question, with no change to the Contract Sum.
- F. RFIs and responses to RFIs shall be numbered consecutively. RFIs reissued for additional clarification or information shall be given decimal extensions (e.g. 12.1).
- G. Responses shall be recorded weekly on record drawings and specifications.

1.6 ARCHITECT'S SUPPLEMENTAL INSTRUCTION (ASI)

- A. Prepared by Architect.
- B. Form provided by Owner or Architect.
- C. No change in time or cost as determined by Architect.
- D. Acceptance by owner required prior to issuance to Contractor.
- E. Transmitted to Contractor for signature.
- F. Contractor must either:
 - 1. Proceed upon receipt.
 - 2. Submit a statement of cost impact within 7 days of receipt.
 - a. If cost impact is justified, Architect shall issue a FA and/or COP.
 - b. If cost impact is not justified, Architect will issue a Notice to Proceed, directing the Contractor to proceed with the work in question, with no change to the Contract sum.
- G. Architect's Supplemental Instructions shall be numbered consecutively. Reissued ASI's shall be given decimal extensions (e.g. 17.1).
- H. Changes shall be recorded weekly on record drawings and specifications.

1.7 CHANGE ORDER PROPOSAL (COP)

- A. Issued by Architect and distributed to Contractor and Owner.
- B. May be initiated by Contractor by submitting a written notice to Architect indicating justification and proposed cost impact.

- C. Contractor must provide cost data and substantiating documentation within 14 days of receipt of COP.
- D. All costs must be summarized on the forms provided by the Owner, utilizing the fees indicated.
- E. Direct costs of labor and fringe benefits shall be limited to the amounts shown in Statements of Intent to pay Prevailing Wages. Additional labor burden costs shall be limited to actual costs substantiated in writing by the Contractor and approved by the Owner and Architect.
 - 1. All indirect costs, including but not limited to such items as insurance, taxes, (except Sales Tax), general conditions, small tool allowance, plant and equipment costs, and the like, shall be included in the fees as provided for on the forms, which shall not exceed the percentages specified in the General and/or Supplemental Conditions.
- F. Architect makes recommendation.
- G. Owner accepts or rejects:
 - 1. Owner/Architect prepares Change Order, or,
 - 2. Owner/Architect requests additional cost data, and/or issues FA.
 - 3. Owner may issue Notice to Proceed to expedite Work.
- H. Accepted and signed COP is binding on both Owner and Contractor. It is the Notice to Proceed and authorization to do the work as soon as practical.
- I. COPs shall be numbered consecutively. Reissued COPs shall be given decimal extensions.
- J. Changes shall be recorded on record drawings and specifications.
- K. COPs and FAs cannot be invoiced until incorporated into an approved Change Order.

1.8 CONSTRUCTION FIELD AUTHORIZATION (FA)

- A. Issued by Architect in response to:
 - 1. An unresolved Architect's Supplemental Instruction.
 - 2. The absence of agreement on Change Order Proposal costs submitted by Contractor.
 - 3. The need to expedite the work and avoid delays.
- B. Form provided by Owner or Architect.
- C. Signed by Architect and Owner.
- D. Contractor must proceed immediately with the work identified in the FA.

- E. Method of adjustment of the Contact Sum shall be determined per General and/or Supplemental Conditions.
- F. FAs cannot be invoiced until incorporated into an approved Change Order.

1.9 CHANGE ORDER (CO)

- A. Prepared by the Owner.
- B. May include several COPs and/or FAs.
- C. Shall be signed by Contractor as soon as practicable.
- D. Change Orders shall be numbered consecutively.
- E. Changes shall be marked on record drawings and specifications.
- F. Costs May be included in Applications for Payment only following approval of the Change Order by the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012600

**CONTRACT CHANGE ORDER PROPOSAL
 (COP)**

DSHS	CONTRACT NO. <u>2016-410G (2-1)</u>
AGENCY	COP No. _____
WSH New Kitchen Commissary Pharmacy	
PROJECT TITLE	

PROPOSAL REQUEST

TO: _____ **(CONTRACTOR)** **PROPOSAL REQUEST DATE:** _____

You are directed to prepare a cost proposal for the work described below and/or detailed on the attachments referred to:

REASON FOR CHANGE: DESIGN ERRORS DESIGN OMISSIONS AGENCY LATENT CONDITIONS CODE REQUIREMENTS VALUE ENGINEERING

EXPLANATION: _____

DATE PROPOSAL REQUIRED: _____ **CHANGE ORIGINATED BY:** _____
 (14 days from Request Date, unless other date agreed to)

PROPOSAL REQUESTED BY: _____

CONTRACTOR PROPOSAL

TO: _____ **(A/E)** **TO:** _____ **PM (E&AS)**

WE AGREE TO PERFORM ALL CHANGE IN THE WORK DESCRIBED IN THE PROPOSAL REQUEST FOR:

CONTRACT SUM:

NO CHANGE
 INCREASE
 DECREASE

} OF _____ \$ _____
 (WASHINGTON STATE SALES TAX NOT INCLUDED)

In accordance with the General Conditions, Cost Estimate Detail Sheet(s) are attached hereto.

CONTRACT TIME:

NO CHANGE
 INCREASE
 DECREASE

} OF _____ CALENDAR DAYS

The foregoing amount covers everything required in connection with the change. All other provisions of the contract remain in full force and effect.

We understand that this proposal does not constitute authorization to proceed with the specified changes in the work until incorporation of this COP into a Change Order by the Department of Enterprise Services.

CONTRACTOR BY _____

SIGNATURE **DATE**

RECOMMENDATION

TO: The Department of Enterprise Services' Authorizing Signator
We have carefully examined this proposal and find the cost to be reasonable. Therefore, we recommend acceptance.

_____ A/E	_____ DATE	_____ E&AS COST VERIFICATION	_____ DATE
_____ AGENCY	_____ DATE	_____ E&AS PROJECT MANAGER	_____ DATE

CONTRACT NO. _____

AGENCY _____

FA No. _____

PROJECT TITLE _____

DESCRIPTION OF CHANGE IN THE WORK

TO: _____ (CONTRACTOR) REQUEST DATE: _____

When authorized by E&AS, you are directed to proceed with work as described below and/or detailed on the attachments referred hereto:

REASON FOR CHANGE: DESIGN ERRORS DESIGN OMISSIONS AGENCY LATENT CONDITIONS CODE REQUIREMENTS VALUE ENGINEERING

EXPLANATION: _____

CHANGE ORIGINATED BY _____
 NAME COMPANY

PROPOSED MAXIMUM SUM/TIME

CONTRACT SUM:
 NO CHANGE
 INCREASE
 DECREASE } **TO THE CONTRACT SUM WITHIN THE PROPOSED MAXIMUM COST OF:**
 _____ DOLLARS \$ _____

The above amount covers the maximum amount required in connection with the change. Washington State sales tax not included.

CONTRACT TIME:
 NO CHANGE
 INCREASE
 DECREASE } OF: _____ CALENDAR DAYS

COST DATA COLLECTION

Cost data required by one of the following methods in accordance with the General and Supplemental Conditions.
 DETAILED COST BREAKDOWN
 UNIT PRICE
 ACTUAL PRICE } _____
 METHOD OF MEASUREMENT

Time & Material with daily work sheets that list the name, trade, firm, hours, itemized materials, equipment and other job related costs. Contractor must obtain verification of hours from _____ (Owner's Rep) within _____ days from the day work was performed. Cost data required by: _____ (Date)

DIRECTION TO PROCEED

Contractor agrees to perform the work described above for the proposed maximum cost and time as shown above. Contractor agrees to give notice to Owner Immediately if time or cost will be exceeded.

\$ _____
FINAL COST

ACCEPTED BY CONTRACTOR _____ DATE _____ CONTRACTOR _____ DATE _____

Proposal reviewed & proposed maximum cost is reasonable. Final cost breakdown has been reviewed and final cost is accepted.

APPROVED BY A/E _____ DATE _____ A/E _____ DATE _____

FUNDING VERIFICATION BY AGENCY _____ DATE _____ AGENCY _____ DATE _____

AUTHORIZED BY E&AS _____ DATE _____ E&AS _____ DATE _____

Payment for work authorized by this FA will not be made prior to incorporation of this FA into a Change Order to the contract by the Department of Enterprise Services.

COST VERIFICATION
 E&AS _____ DATE _____

FINAL APPROVAL

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Schedule of Values and Applications for Payment.
- B. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit itemized Applications for Payment as required in General Conditions together with Schedule of Values and other submittals as listed herein.
- B. Except as otherwise indicated, sequence of progress payments is to be regular, once per month; and each must be consistent with previous Applications and payments. It is recognized that certain Applications, including the Initial Application, the Application following Substantial Completion, and the Final Application for Payment include additional requirements specific to that Application.
- C. The Contractor shall certify that to the best of its knowledge, information, and belief, the work covered by each Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by him for work for which previous Applications for Payment were issued and that all computations, attachments, invoices and representations are truthful and accurate.
- D. Except as otherwise indicated, the Contractor shall complete every entry provided for on the various forms, and execution by authorized persons. Incomplete applications shall be returned by the Architect without action
 - 1. Entries must match current data in the Schedule of Values and the Construction Progress Schedule.
- E. Payment-Application Times: The period covered by each Application shall be one calendar month.
- F. Payment-Application Forms: Use the State of Washington Application for Payment on Contract form.
 - 1. <http://www.des.wa.gov/services/facilities-leasing/public-works-design-construction/formsreference-documents>

- G. Application Preparation: Complete every entry on the form. The Architect will return incomplete applications without action. Responsibility for delay of payment due to incomplete, inaccurate or incorrect forms shall be the Contractor's.
1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Field Authorizations issued prior to the last day of the construction period covered by the application. Show such amounts separately from other work already included in the Schedule of Values.
- H. Diversity Participation Reporting: Submit the following payment information per the Instructions to Bidders through <https://des.diversitycompliance.com>.
1. Payments received by the prime contractor from the Agency.
 2. Payments paid to each subcontractor, including lower tier subcontractors.
 3. Payments paid to each supplier.
- I. Transmittal: Submit 4 signed original copies of each Application for Payment to the Architect and Owner by a method ensuring receipt within 24 hours. All applications shall be complete, including waivers of lien and similar attachments. Applications may be submitted in electronic format if approved by the Owner.
1. Transmit each application with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
- J. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following. Failure to submit any of the following is sufficient grounds to withhold processing of Application for Payment.
1. List of subcontractors.
 2. List of principal suppliers and fabricators.
 3. Approved Schedule of Values.
 4. Approved Contractor's Construction Schedule.
 5. Schedule of principal products and submittals.
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of any building permits, authorizations and licenses to be obtained by the Contractor from governing authorities for performance of the Work.
 9. Certificates of insurance and insurance policies not previously required or filed.
 10. Proof of submission of Intent to Pay Prevailing Wage documentation must be submitted to the Owner prior to the first payment application, and every subsequent application, in which a subcontractor is being paid for the first time.
- K. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This application shall reflect Certificates of Partial Occupancy issued previously for Owner occupancy of designated portions of the Work.
 2. Administrative actions and submittals that must be submitted to the Owner through the Architect prior to the time of Application for Payment at Substantial Completion are set forth below. See also the requirements of Division 01 Section "Closeout Procedures."
 - a. Signed and itemized receipt that maintenance and other personnel instruction and classes have been presented including signed receipt for each instructional session from Owner's representative. List date; length of time; names of Owner's personnel in attendance and location.
 - b. Removal of temporary facilities and services no longer required by the work.
- L. Final Payment Application: Administrative actions and submittals that must be submitted to the Owner through the Architect prior to the time of Application for Payment at Final Completion are set forth below. See also the requirements of Division 01 Sections.
1. Ensure that unsettled claims have been settled.
 2. Signed receipt of transmittal of required Project construction records to the Owner.
 3. Removal of temporary facilities and services, if not previously accomplished.
 4. Removal of surplus materials, rubbish, and similar elements.
 5. Project Permit Drawings and related documents including copies of the signed off permit sheets.
 6. All final submittals shall be submitted at the same time. Partial submittals will not be processed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012900

SECTION 012973 - SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 GENERAL

- A. Within ten (10) days after Award of Contract, submit Schedule of Values to Owner and Architect.
 - 1. Coordinate and integrate with CPM schedule.
 - 2. Support values if requested by Architect.
 - 3. Use Schedule of Values as basis for Application for Payment.
- B. Coordinate related requirements specified in other parts of the Project Manual.

1.3 FORM

- A. Submit the Schedule of Values on the State of Washington invoice Voucher Form A-19, listing not less than one item for all pertinent activities applicable to each Section of the Project Manual, and relating directly to the pertinent application activities of the CPM Schedule.
- B. Identify each item with number and title of respective major Specification Sections.
- C. Correlate line items with other administrative schedules and forms required for the work, including CPM progress schedule, payment request forms, listing of subcontractors, Schedule of Allowances, listing of products and principal suppliers and fabricators, and Schedule of Submittals.
- D. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of payment request and progress reports. Each line item shall have a separate categories to indicate the cost for materials, labor and closeout.
- E. No line item shall exceed \$250,000. Labor and/or materials for a portion of the Work in excess of this amount shall be subdivided into smaller, easily identifiable items of work.
- F. Break down principal subcontract amounts into multiple line items.
- G. Upon request of the Architect, submit further breakdown of the work in any of the Sections of the Project Manual.
- H. Change Orders and their approved sums are to be listed as separate items.

I. Listings: Arrange schedule with columns to indicate the following:

1. Item number: Use sequential numbering system.
2. Specification Section: Indicate Specification Section, using decimal extensions, as required, if more than one subcontractor, supplier, etc., is involved, or if Work is broken down by phase or area (e.g. wall framing, roof framing, etc.).
3. Description of Work: For each line item of work involving labor and materials, provide individual sub-line items for (a) Material, (b) Installation/Labor and (c) Closeout.: All line items, whether or not involving installation/labor shall include a sub-line item for Closeout.
4. Total dollar value of each line item.
5. Percentage of Contract Sum (total shall add up to 100%).

1.4 CONTENT

A. Include separate line item values (or multiple line items where applicable) for:

1. General Contractor's overhead and profit for entire project.
2. General Contractor's project management and supervision.
3. Project closeout per General Conditions.
4. Allowances.
5. Construction Surveying.
6. CPM Schedule.
7. Mobilization per General Conditions.
8. Bond.
9. Insurance.
10. Security Fencing.
11. Site Clearing.
12. Site Grading.
13. Site utilities (separate line items for each utility type).
14. Building Envelope Completion (dry-in complete).
15. Air Barrier and Envelope Testing.
16. Permanent Electrical Power.
17. Mechanical Equipment Start Up.
18. Commissioning Pre-Functional Checklist.
19. Assist Commissioning – Mechanical.
20. Assist Commissioning – Electrical.
21. Owner Training – General.
22. Owner Training – Equipment (Kitchen, Commissary, etc.)
23. Owner Training – Mechanical.
24. Owner Training – Electrical.
25. Final Cleaning.
26. Site Cleanup.
27. Project Record Plans & Specification.
28. Operations and Maintenance Manuals.
29. Landscape Maintenance.
30. Technology Cabling.

1.5 SCHEDULE UPDATING

- A. Update and resubmit Schedule of Values when Change Orders affect listing and when actual performance of the work involves necessary changes of substance to values previously listed.

1.6 SUBMITTAL

- A. Submit electronic copies of Schedule to Architect and Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012973

SECTION 013113 – PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

- A. Minimum administrative and supervisory requirements necessary for coordination of work on the project include but are not necessarily limited to the following categories:
 - 1. Coordination and meetings.
 - 2. Health Department inspections.
 - 3. Administrative and supervisory personnel.
 - 4. Surveys and records or reports.
 - 5. Limitations for use of site.
 - 6. Special reports.
 - 7. General installation provisions.
 - 8. Cleaning and protection.
 - 9. Conservation and salvage.
 - 10. Cultural resources.
 - 11. Construction waste and indoor air quality management.
- B. In addition, the Contractor will be responsible to carry out the execution of the commissioning process in conjunction with the Commissioning Agent.

1.3 COORDINATION AND MEETINGS

- A. General: Prepare a written memorandum on required coordination activities. Include such items as required notices, reports and attendance at meetings. Distribute this memorandum to each entity performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.
- B. Weekly Coordination Meetings: Hold weekly Contractor's Coordination Meetings at regularly scheduled times convenient for all parties involved. Request representation at each meeting by every subcontractor/supplier currently involved in ongoing Work, or involved in the coordination or planning of the entire project.
- C. Coordination of Additional Project Information: The Contractor shall be responsible for timely distribution to all affected subcontractors and suppliers of supplemental information developed or provided during the course of construction. To the extent possible, requests for additional information from the Architect or Owner should be addressed at the weekly coordination meetings, with responses recorded in the meeting minutes. When not possible, a Request for Information (RFI) form shall be submitted by the Contractor to the Architect.

- D. Coordination of Commissioning Activities: Coordinate and execute Commissioning per other Specification Sections and related requirements.

1.4 HEALTH DEPARTMENT INSPECTIONS

- A. General: The Washington State Department of Health (DOH) requires the following on-site inspections:
 - 1. Prior to the placement of the gypsum wall board.
 - 2. Prior to placement of ceiling tiles.
 - 3. Two weeks prior to final inspection by the local building official.
- B. Notify the DOH at least one week prior to these inspections.

1.5 ADMINISTRATIVE/SUPERVISORY PERSONNEL

- A. General: In addition to the required General Superintendent, provide additional administrative and supervisory personnel required for performance and coordination of the work.
- B. Project Coordinator: Provide a Project Coordinator experienced in administration and supervision of building construction, including mechanical and electrical work. This Project Coordinator is hereby authorized to act as general coordinator of interfaces between units of work. For the purpose of this provision, "interface" is defined to include scheduling and sequencing of work, sharing of access to work spaces, installations, protection of each other's work, cutting and patching, tolerances, cleaning, selections for compatibility, preparation of coordination drawings, inspections, tests, and temporary facilities and services.
- C. Contractor's Commissioning Coordinator (CCC): The Contractor shall provide a qualified Contractor's Commissioning Coordinator who meets the requirements set forth in Section 019113 - General Commissioning Requirements, with responsibilities as defined therein. Commissioning procedures will be designed and conducted by a Commissioning Agent (CA) contracted by the Owner.
- D. Testing, Adjusting and Balance Contractor (TAB): The Contractor shall provide the services of a qualified TAB contractor. The qualifications of the TAB contracting firm shall be submitted, along with the specific qualifications of the lead site technician who will remain on site during all TAB work, within 30 days of notice to proceed. Recent past projects shall be listed and described for both the company and the lead technician. Names and telephone numbers of the project contractors and facility managers will be provided.
 - 1. The Owner must approve in writing the qualifications of both the company and the lead technician.
- E. Submittal of Staff Names, Duties: Within 15 days of Notice to Proceed, submit a listing of Contractor's principal staff assignments and consultants, naming persons and listing their addresses and telephone numbers.

1.6 SURVEYS AND RECORDS/REPORTS

- A. General: Working from lines and levels indicated on the drawings, establish and maintain bench marks and markers to set lines and levels for the work at each story of construction and elsewhere as needed to properly locate each element of the project. Calculate and measure required dimensions as shown within recognized tolerances. Drawings shall not be scaled to determine dimensions. Advise entities performing work, of marked lines and levels provided for their use.
- B. Surveyor: Engage a licensed, Professional Land Surveyor or Professional Engineer experienced and specializing in land survey work, who is registered in the State of Washington, to perform those services specified in this article.
- C. Survey Procedures: Before proceeding with the layout of actual work, verify the layout information shown on the drawings, in relation to the property survey and existing benchmarks. As work proceeds, check every major element for line, level and plumb. Maintain a surveyor's log or record book of such checks; make this log or record book available for the Architect's or Engineer's reference. Record deviations from required lines and levels, and advise the Architect or Engineer promptly upon detection of deviations that exceed indicated or recognized tolerances. Record deviations which are accepted, and not corrected, on record drawings.

1.7 LIMITATIONS ON USE OF THE SITE

- A. General: Administer allocation of available space equitably among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

1.8 SPECIAL REPORTS

- A. General: Submit special reports directly to the Owner within one day of an occurrence. Submit a copy of the report to the Architect/Engineer and other entities that are affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at the site, prepare and submit a special report listing chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner in advance when such events are known or predictable.
- C. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

1.9 CONSTRUCTION WASTE AND INDOOR AIR QUALITY MANAGEMENT

- A. LEED requirements need ongoing coordination and reporting to ensure subcontractor participation. Contractor shall either conduct separate construction waste and indoor air quality management meetings or discuss goals and issues as part of the following regular meetings.
 - 1. Pre-construction and pre-installation meetings.
 - 2. Weekly subcontractor meetings.
 - 3. Conduct Special Construction Waste and Indoor Air Quality Management meetings once building weather enclosure is complete.

1.10 CULTURAL RESOURCES

- A. The Contractor shall coordinate with the Owner's selected Archeologist once initial vegetation has been removed to allow for further assessment of the site.

1.11 CONSTRUCTION WASTE AND INDOOR AIR QUALITY MANAGEMENT

- A. LEED requirements need ongoing coordination and reporting to ensure subcontractor participation. Contractor shall either conduct separate construction waste and indoor air quality management meetings or discuss goals and issues as part of the following regular meetings:
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Pre-fabrication meeting.
 - 4. Regular job-site meetings.
 - 5. Job safety meetings.
 - 6. Special Construction Waste and Indoor Air Quality Management meetings.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

- A. Pre-Installation Meetings: Hold a pre-installation meeting at the project site well before installation of each unit of work which requires coordination with other work. Installer and representatives of the manufacturers and fabricators who are involved in or affected by that unit of work, and with its coordination or integration with other work that has preceded or will follow shall attend this meeting. Advise the Owner/Architect/Engineer of scheduled meeting dates.
 - 1. Do not proceed with the work if the pre-installation meeting cannot be concluded successfully. Initiate whatever actions are necessary to resolve impediments to performance of the work, and reconvene pre-installation meeting at earliest date feasible.

- B. Installer's Inspection of Conditions: Require the Installer of each major unit of work to inspect the substrate to receive work and conditions under which the work is to be performed. The Installer shall report all unsatisfactory conditions in writing to the Contractor, prior to the Pre-Installation Meeting. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- C. Manufacturer's Instructions: Where installations include manufactured products, comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than requirements indicated in the contract documents.
- D. Inspect each item of materials or equipment immediately prior to installation. Reject damaged and defective items.
- E. Provide attachment and connection devices and methods for securing work. Secure work true to line and level, and within recognized industry tolerances. Allow expansion and movement. Provide uniform joint width in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable visual-effect choices to the Architect for final decision.
- F. Recheck measurements and dimensions of the work, as an integral step of starting each installation.
- G. Install each unit-of-work during weather conditions and project status which will ensure the best possible results in coordination with the entire work. Isolate each unit of work from incompatible work, as necessary to prevent deterioration.
- H. Coordinate enclosure or covering of the work with required inspections and tests, so as to minimize the necessity of uncovering work for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry-recognized standard (including ADA) mounting heights for the particular applications indicated. Refer questionable mounting height choices to the Architect for final decision.

3.2 CLEANING AND PROTECTION

- A. General: During handling and installation of work at the project site, clean and protect work in progress and adjoining work on a basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration at time of substantial completion.
- B. Clean and perform maintenance on installed work as frequently as necessarily through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures of Work: To the extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to

harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.3 CONSERVATION AND SALVAGE

- A. General: It is a requirement for supervision and administration of the work that construction operations be carried out with the maximum possible consideration given to conservation of energy, water and materials and to the recycling of excess and waste materials. In addition maximum consideration shall be given to salvaging materials and equipment involved in performance of the work but not incorporated therein.

END OF SECTION 013113

SECTION 013119 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including but not limited to, the following:
 - 1. Preconstruction meeting.
 - 2. Weekly construction progress meetings.
 - 3. Contractor's coordination meetings.
 - 4. Pre-installation meetings.
 - 5. Commissioning Meetings.

1.3 PRECONSTRUCTION MEETING

- A. Preconstruction Meeting: A meeting shall be scheduled by the Architect following Award of Contract. Administrative requirements such as Schedule of Values, Contractor's Quality Control Plan, Applications for Payments, progress schedules, Change Order procedures, Substantial Completion, Project Closeout, and Final Completion shall be addressed as well as other items on the standard DES Preconstruction meeting agenda form.
- B. Agenda: Architect shall prepare agenda.
- C. Discussion will cover items of significance including but not limited to the following:
 - 1. Communication chain and persons authorized to direct changes;
 - 2. The Work;
 - 3. Owner's Site Representatives roles;
 - 4. Work hours, sequence, phasing and occupancy;
 - 5. Procedures and processing;
 - a. Applications for Payments;
 - b. Change Order Proposals (COPs);
 - c. Field Authorizations (FAs);
 - d. Change Orders (COs);
 - e. Requests for Information (RFIs);
 - f. Architect's Supplemental Instructions (ASIs);
 - g. Submittals and Submittal Transmittal Forms;
 - h. Others as appropriate.
 - 6. Project Record Documents (Drawings and Specifications) review on a regular basis;

7. Construction facilities and controls;
 8. Temporary utilities;
 9. Security procedures;
 10. Housekeeping procedures;
 11. Parking and Deliveries;
 12. Project Schedule;
 13. Contractor's Quality Control Plan (CQC);
 - a. CQC Administrator.
 - b. CQC Daily Reports.
 - c. CQC pre-installation and installation conditions documentation; and
 - d. CQC pre-installation meetings.
 14. Use of site and premises by Owner and Contractor;
 15. Emergency phone numbers;
 16. Others as appropriate.
- D. Record: Meeting minutes shall be taken by the Architect and shall stand as recorded unless objected to in writing by the Contractor within five (5) days of receipt.
- E. Attendees:
1. Testing Lab Representative.
 2. Soils Engineer.
 3. Owner.
 4. Architect and major subconsultants.
 5. Contractor's Project Manager, Superintendent, and major Subcontractors including: Earthwork, Utilities, Mechanical, Electrical, and as applicable.

1.4 CONSTRUCTION PROGRESS MEETINGS

- A. The Contractor will schedule weekly meetings at Contractor's job site field office to enable an orderly review of the construction progress and to provide for systematic discussion and analysis of concerns that may arise relative to execution of the Work.
- B. Attendees:
1. Architect and Architect's Consultants, as appropriate;
 2. Owner's representatives;
 3. Contractor's superintendent, project manager and CQC Plan Administrator;
 4. Subcontractors, as appropriate;
 5. Suppliers, as appropriate; and
 6. Others, as appropriate.
- C. Agenda: The following items will be discussed:
1. Review and approve minutes of previous minutes;
 2. Review work progress since previous meetings (3-week short-term schedule);
 3. Review work scheduled for next two weeks (3-week short-term schedule);

4. Review CPM schedule to confirm current status of Work, including material delivery status;
 5. Review Safety program and report any incidents.
 6. Review Contractor's Quality Control records;
 7. Review the status of the following procedural processes and documents as required/appropriate/necessary/needed;
 - a. Applications for Payments.
 - b. Diversity compliance reporting on des.diversitycompliance.com.
 - c. Change Order Proposals (COPs).
 - d. Field Authorizations (FAs).
 - e. Change Orders (COs).
 - f. Requests for Information (RFIs).
 - g. Architect's Supplemental Instructions (ASI).
 - h. Submittals.
 - i. Construction waste management update
 - j. LEED requirements and reporting
 - k. Commissioning update
 - l. As-Built document updates.
 8. Present, discuss and, when possible, resolve field observation problems, conflicts, risks and concerns.
 - a. Civil/Landscape items.
 - b. Structural items.
 - c. Controls items.
 - d. Mechanical items.
 - e. Electrical items.
 - f. Architectural/Miscellaneous items.
 9. Coordination of separate contracts.
 10. Other business as required.
- D. Record: Meeting minutes shall be taken by Architect, and shall be reviewed at the following Meeting, subject to comments/corrections noted and incorporated into the Minutes of said Meeting.
- E. Monthly: Monthly tasks shall include:
1. Update and coordination of submittal and change logs.
 2. Review of Application for Payment.
 3. Review of updated CPM schedule.

1.5 CONTRACTOR'S COORDINATION MEETINGS

- A. Contractor shall hold weekly coordination meetings with his subcontractors and suppliers for coordination of the Work. Meetings shall be held on-site.

- B. Contractor's Coordination Meetings are in addition to meetings held for other purposes such as weekly Construction Progress Meetings or CQC Pre-installation Meetings.
- C. Contractor shall record minutes of meetings and distribute copies to Owner and Architect, and to others affected by decisions or actions resulting from each meeting, within two days of the meeting.

1.6 CQC PRE-INSTALLATION MEETINGS

- A. General: Not less than seven (7) days prior to commencement of work listed below or as otherwise determined by the Architect or the Owner, the General Contractor or his superintendent, the responsible foremen for the subcontractors performing said Work, plus all associated sub-subcontractors, suppliers, fabricators, vendors, and others as appropriate, including the Owner and Architect, shall attend a meeting for the purpose of establishing a full understanding of the procedures and requirements for the orderly progress of the designated Work.
- B. All subcontractors and major suppliers are required to attend these pre-installation meetings prior to commencing work on their respective Specification Sections. Contractor may elect to group several Sections or Divisions to minimize the number of these meetings. Refer to Specification Sections "Project Coordination" and "Quality Requirements" for additional requirements pertaining to project coordination and quality requirements, respectively.
- C. Contractor shall schedule meetings and notify Architect and Owner not less than seven (7) days prior to the date of the meetings. All applicable submittals as well as the Contractor's safety plan and insurance certificates shall have been submitted to and approved by the Owner prior to the scheduling of any meetings. Work requiring pre-installation meetings includes, but is not necessarily limited to the following:
 - 1. Earthwork,
 - 2. Landscaping and Irrigation,
 - 3. Site Improvements,
 - 4. Concrete – Architectural precast and architectural finishing,
 - 5. Masonry,
 - 6. Structural Steel,
 - 7. Commissioning – Building envelope, mechanical and electrical systems,
 - 8. Roofing/Sheet Metal,
 - 9. Windows/Storefronts/Curtain Walls/Glazing,
 - 10. Gypsum Board Assemblies,
 - 11. Floor Finishes – Carpet/resilient/wood/polished concrete,
 - 12. Painting,
 - 13. Controls – HVAC and Lighting,
 - 14. Testing, Adjusting and Balancing,
 - 15. Fire Suppression System,
 - 16. Fire Alarm System,
 - 17. Audio/Visual Systems,
 - 18. Telecommunications Cabling,
 - 19. Intrusion Detection and/or Access Control Systems,
 - 20. Distributed Antenna System, if any.

21. Elevator.
22. Food Service Equipment.
23. All work on the critical path and/or otherwise deemed necessary or appropriate.

- D. Contractor shall record minutes of meeting and distribute copies to Owner and Architect, and to others affected by decisions or actions resulting from each meeting, within seven (7) days of date of Meeting.

1.7 COMMISSIONING MEETINGS

- A. Refer to Division 01 Section "Commissioning General Requirements" and individual Specification Sections, for attendance, scheduling, and agenda requirements and responsibilities.

1.8 CLOSEOUT MEETING

- A. At the point when the construction is approximately 75 percent complete, the Contractor shall request and schedule a meeting to review project closeout requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013119

SECTION 013216 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 CONSTRUCTION PROGRESS SCHEDULE

A. General

1. The Contractor's CONSTRUCTION PROGRESS SCHEDULE (Schedule) shall be based upon a Critical Path Method (CPM) analysis of construction activities and sequence of operations needed for the orderly performance and completion of all separable parts of the Work in accordance with the Contract and within the Contract Time. The Schedule shall be a critical path method type in the form of a precedence diagram and activity listing, and shall be time scaled. It shall include the Date of Notice to Proceed, Date(s) of Substantial Completion, and Date(s) of Final Completion in accordance with the Contract Documents, and all other information included on the CONSTRUCTION PROGRESS SCHEDULE CHECKLIST contained herein. The Schedule shall be developed using Microsoft Project or software acceptable to the Owner.
2. The Network Diagram shall show in detail, and in order, the sequence of all significant activities, their descriptions, start and finish dates, durations and dependencies, necessary to complete all Work and any separable parts thereof. The Activity Listing shall show the following information for each activity on the Network Diagram:
 - a. Description;
 - b. Duration (not to exceed 15 days);
 - c. Trade;
 - d. Equipment (including hours of usage)
 - e. Start and finish dates;
 - f. Total float time and free float time; and
 - g. Dates that must be performed and completed by other contractors or subcontractors to support the Work and the interfaces with other contractors and subcontractors.
3. A schedule for the purchase and receipt of items required for performance of the Work, showing lead times between purchase order placement and delivery dates, shall be integrated into, coordinated with and indicated on the Contractor's CONSTRUCTION PROGRESS SCHEDULE. The Contractor shall furnish the Architect copies of the following documents within ten (10) days of Contractor's receipt of same, for all items on the Critical Path:
 - a. Purchase orders and acknowledgments of fabrication; and
 - b. Production and shipping schedules.

- c. Neither the Architect nor the Owner shall be deemed to have accepted any such material, or its schedule, nor deemed to have waived this requirement if some or all of the above referenced documentation is not received.
4. Milestones shall be clearly defined, integrated, coordinated with, and indicated on, the Contractor's Construction Progress Schedule. Milestones on the critical path shall occur at intervals not exceeding fourteen (14) days, with progress tracked and reviewed at weekly meetings.
5. If abbreviations are used in the Contractor's Construction Progress Schedule, a legend shall be provided to define all abbreviations.
6. The Contractor shall prepare and keep current a SCHEDULE OF SUBMITTALS, integrated and coordinated with the Contractor's Construction Progress Schedule, which allows the Architect and Owner at least ten (10) working days or as otherwise provided for in the Contract Documents, to review and return each submittal or re-submittal. This shall apply to all submittals, including all those on the critical path.
7. Within ten (10) working days after receipt by the Architect, two (2) copies of the Contractor's Construction Progress Schedule and attached Checklist, certified by the Contractor, will be returned to the Contractor. The Architect's review will be focused primarily on the completeness of the Schedule as determined by evaluation of the accompanying Checklist. Review by the Owner and/or Architect of the Contractor's Construction Progress Schedule shall not constitute an approval or acceptance of the Contractor's construction means, methods or sequencing, or its ability to complete the Work in a timely manner.
8. The Contractor shall utilize and comply with its Construction Progress Schedule. The Contractor shall not be entitled to any adjustment in the Contract Time, the Contract Sum, or the Construction Progress Schedule, or to any additional payment of any sort, by reason of the loss or use of any float time (the amount of time that one or more activities may be delayed without causing delay to the contract Date of Substantial Completion), by either the Owner or the Contractor, including time between the Contractor's anticipated completion date and end of Contract Time, whether or not the float time is described as such on the Contractor's Construction Progress Schedule.
9. The Contractor shall submit an updated Construction Progress Schedule on a monthly basis, coinciding with the monthly submittal of its preliminary Application for Payment. The updated schedule shall indicate actual work completed and shall make adjustments to those activities where the Contractor has not met the scheduled dates as shown on its current schedule. The updated schedule shall also reflect any changes in the Contractor's sequence of work. Each updated monthly Construction Progress Schedule shall be in full compliance with contract requirements, including dates of Substantial and Final Completion.
10. The Contractor shall, within seven (7) calendar days of the event, notify the Owner and Architect, in writing, of any proposed changes in the Contractors Construction Progress Schedule, or the Contract Time, resulting from or caused by the event, and of any event that could delay performance or supplying of any item of the Work, and shall indicate the expected duration of the delay, the anticipated effect of the delay on the Contractor's Schedule, and the action being

taken to correct the delay situation. In the event the Contractor is entitled to a change in the Contract Time, the adjustment to the Contract Time shall be limited to the change in construction activities on the Critical Path as authorized by Changes in the Work.

11. The Contractor shall achieve Final Completion of the Work in accordance with the General Conditions and Form of Agreement.

B. Schedule Format and Content

1. The format and content of the Contractor's Schedule shall be as indicated on the Contractor's Construction Progress Schedule Checklist included at the end of this Section. The Checklist shall be completed and certified by the Contractor and submitted with the initial Construction Progress Schedule.

C. Schedule/Report Submittals

1. All schedules and reports shall be submitted in both hard copy and machine-readable electronic format.
2. Initial Submittal:
 - a. Submit initial Schedule and certified Checklist for review within ten (10) days after Award of Contract. Architect will review and return within ten (10) days of receipt.
3. Resubmittal
 - a. If required, resubmit within seven (7) days after return of Initial Submittal.
4. Distribution
 - a. Following initial submittal to and response by Architect, print and distribute Construction Progress Schedule, including Submittal Schedule/Report, Critical Path Material Delivery Report and any other Report requested by the Owner that should be printable from the information contained in the Schedule's data base. Distribute schedules and reports to Architect, Owner, principal subcontractors, suppliers or fabricators, and others with a need to know the schedule. Post copies in project meeting rooms and field office. Distribute and post subsequent updated issues to same entities when revisions are made, except delete entities from distribution when they have completed assigned Work, and are no longer involved in performance of scheduled Work.

D. Use of Float Time

1. The actual construction shall comply with the Contractor's Construction Progress Schedule. Any float time in addition to that which is required in the General Conditions shall be deemed to be for the joint use of the Owner and the Contractor, provided that in the event of any conflicting need for, or any overlapping use of, any float time, the Owner shall have priority and the

Contractor shall not be entitled to an extension of the activity(ies) or Contract Time, or to any additional payment of any kind due to the Owner's use of the float time.

E. Inclement Weather

1. The Contractor's Schedule shall anticipate, and include provisions for, a minimum of seven (7) workdays of unforeseen or exceptionally inclement weather that will negatively impact the Work. The Contractor shall identify additional days of anticipated inclement weather, as necessary, based on its own analysis of historical data, a copy of which shall be provided to Owner upon request. The Contractor's use of one or more days of anticipated yet unforeseen inclement weather is subject to the Contractor's submittal of substantiating data based on standards established by University of Washington and National Oceanic and Atmospheric Administration, and requirements of General Conditions. Anticipated unforeseen inclement weather shall be included as a critical path activity on the Schedule.

F. Schedule of Submittals:

1. Schedule of Submittals (shop drawings, product data, samples and all other required submittals) shall be coordinated with and incorporated in the Construction Progress Schedule.
2. Schedule of Submittals may be presented as a report generated from the CPM database to simplify printing of CPM schedule.

1.3 SHORT-TERM INTERIM PROJECT SCHEDULE AND REPORT

- A. Contractor shall submit on a weekly basis, coinciding with the weekly Construction Progress Meetings, a short-term schedule, in bar chart form, indicating work completed the previous week and work scheduled for the following two (2) week period. Schedule shall be updated weekly.
- B. Schedule shall include deliveries, submittals, COP and CCD Work identified by document number, and commissioning activities per Division 01 Section "General Commissioning Requirements."
- C. Short-term Interim Schedule shall be derived from and correlated with the Construction Progress Schedule, with corresponding activity names and numbers.
- D. Contractor shall submit on a weekly basis, together with the short-term interim project schedule, a written report, in a form acceptable to the Owner, comparing the previous week's actual progress to the progress indicated on the previous week's schedule.

1.4 OWNER OCCUPANCY

- A. The Western State Hospital Food Services (Kitchen) operates on a full time basis. The Owner will begin operations in the new kitchen facility while maintaining the operations at the existing kitchen facility for a period of two weeks. Existing equipment cannot be

relocated from the existing kitchen to the new building until after this two week period is completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

CONSTRUCTION PROGRESS SCHEDULE CHECKLIST
 (To be submitted with Contractor’s Initial Schedule Submittal)

The Contractor shall complete the following checklist addressing format and content of Contractor’s Construction Progress Schedule. For submittal to be complete, all boxes must be checked, and each item certified (initialed) by the Contractor. Architect shall review schedule and confirm that each item is complete.

NO.	DESCRIPTION	CONTR. CERT.	ARCH. CERT.
<input type="checkbox"/>	1. Titled "Construction Progress Schedule"	_____	_____
<input type="checkbox"/>	2. Date of original submittal with revision date for each update	_____	_____
<input type="checkbox"/>	3. Paper size and production method suitable for updating and reproduction throughout duration of project	_____	_____
<input type="checkbox"/>	4. Time-Scaled CPM network diagram indicating project completion at Contract Date of Final Completion	_____	_____
<input type="checkbox"/>	5. Indicate no more than one (1) critical path	_____	_____
<input type="checkbox"/>	6. Activity Type CPM Schedule clearly identifying the activity and time required for the activity	_____	_____
<input type="checkbox"/>	7. Plotted to a calendar-day-based horizontal time scale divided into weekly increments.	_____	_____
<input type="checkbox"/>	8. Logical sequence of the Work to be accomplished.	_____	_____
<input type="checkbox"/>	9. Order and interdependence of the planned activities. Indicate CPM dummy Constraints.	_____	_____
<input type="checkbox"/>	10. Resource Loaded (labor, materials & equipment).	_____	_____
<input type="checkbox"/>	11. No activity longer than 15 calendar days.	_____	_____
<input type="checkbox"/>	12. Indicate phases or major areas of construction of the CPM Schedule by logically grouping activities and indicating phase or area in large print.	_____	_____
<input type="checkbox"/>	13. Start and finish dates, and lag or overlap of each major element of construction.	_____	_____
<input type="checkbox"/>	14. Projected percentages of completion for each item on last day of each pay period.	_____	_____
<input type="checkbox"/>	15. Include work to be performed by others, if any.	_____	_____

- 16. Required actions of Owner materially and/or logically affecting completion date. _____
- 17. Delivery dates of all major items, especially long lead time items. _____
- 18. All interconnecting phases of work among trades, especially where one trade's work affects the schedule of others. _____
- 19. All work affected by seasonal conditions. _____
- 20. Construction of all facilities. _____
- 22. Activities correlated with Specification Sections and Sub-sections _____
- 24. Inclement weather on critical path. _____
- 25. Date building envelope is complete (dried in). _____
- 26. Date power to the building is energized. _____
- 27. Date HVAC equipment ready to be energized. (3 months prior to Substantial Completion) _____
- 28. Date Building Automation System with HVAC controls ready. (2 months prior to Substantial Completion) _____
- 29. Date for Cx Functional Performance Tests. (1 month prior to Substantial Completion) _____
- 30. Suspended Ceiling Grid ready for Cover. _____
- 31. Building Flush-out (for each program area). _____
- 32. TAB Preliminary Report complete. _____
- 33. Identify all float times, including total days. _____
- 34. Incorporates Schedule of Submittals _____
- 35. Correlated with Schedule of Values. _____
- 36. Clearly identify Closeout Phase. Identify all major activities and submittals individually. Schedule must show a clear understanding of the relationships between, and requirements for, Substantial Completion, Punch Lists, Site Cleaning, Site Maintenance, Record Documents, Final Completion, Final Acceptance, etc. _____
- 37. Identify all instances of required Notifications from Contractor related to specific events such as Commissioning, Substantial Completion, etc. _____
- 38. Identify Commissioning activities and milestones and related items. _____
- 39. Two-week concurrent kitchen operation period. _____
- 40. All other requirements of this and other applicable Sections, whether listed here or not. _____

SECTION 013323 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 GENERAL

- A. This section includes administrative and procedural requirements for project submittals including, but not limited to, product information, shop drawings, manufacturer's instructions and certificates, and samples.
 - 1. Individual submittal requirements are specified in applicable sections for each unit of work.
 - 2. Submittals shall be made early enough to account for processing described herein and a reasonable period for thorough review by the Architect and Engineers. Submittals requesting action in less than ten (10) working days shall be deemed untimely submittals and shall be documented as such.
 - 3. Maintain Schedule of Submittals; transmit at or before time indicated.
 - a. Proposed Schedule of Submittals shall be incorporated into initial Construction Progress Schedule and shall be submitted in a report format within 15 workdays after Notice to Proceed.
- B. The Contractor is responsible for providing the Commissioning Authority with copies of the following information for inclusion in the Systems Manual. The Commissioning Authority will compile the final Systems Manual based on the contractor submitted documentation along with additional material provided by the Commissioning Authority.
 - 1. As-built documents
 - 2. Description of systems, including capabilities and limitations
 - 3. Operating procedures for all normal, abnormal, and emergency modes of operation
 - 4. Sequence of operation as actually implemented, with control system data including all set points, calibration data, etc.
 - 5. Location of all control sensors and test ports.
 - 6. Seasonal start-up and shutdown procedures.
 - 7. Control schematics and computer graphics
 - 8. Complete terminal interface procedures and capabilities for DDC systems.
 - 9. A list of recommended operational recordkeeping procedures including sample forms, trend logs, or others, and a rationale for each
 - 10. Maintenance procedures

1.3 FORMAT

- A. Identify each submittal with date, project title, detail number and specification section, and re-submittal information if applicable.

- B. Contractor shall stamp and sign each submittal indicating compliance with field dimensions and Contract Documents and/or substitutions allowed by Addenda.
- C. Include a Submittal Transmittal form (sample copy bound herein) with each submittal indicating specification section. Do not reference more than one specification number on a single Submittal Transmittal form. The Submittal Transmittal form shall be used by all parties as the cover sheet for all submittal transmittals.
 - 1. Provide one (1) copy transmitted electronically with the exception of samples for color or finish selection.
 - 2. Provide minimum of five (3) copies of each sample for color or finish selection, or for submittals that cannot be transmitted electronically:
- D. Coordinate submittal of different units of interrelated work so that no submittal will be delayed by the Architect's need to review a related submittal. The Architect reserves the right to withhold action on any such submittal until the related submittals and/or samples are received.
- E. Indicate need for Architect/Owner selection, if any.
- F. Deviations: Any deviations from Contract Documents in submittals shall be clearly and distinctly denoted.
- G. Reference to work "by other" or "by others", or any similar designation, shall be assumed to mean "by Contractor" unless otherwise noted. Unless specifically referenced as work or materials "by Owner," work or materials referenced shall be interpreted as being included in the Contract.

1.4 SUBMITTALS REQUIRED

- A. Submittals include but are not limited to:
 - 1. Identification of subcontractors.
 - 2. Construction Progress Schedules.
 - 3. Site plan indicating usage for staging, storage, temporary controls, etc.
 - 4. Shop drawings, product data, and samples.
 - 5. Mock-ups.
 - 6. Quality Control Plan per Division 01 Section "Quality Requirements."
 - 7. Schedule of Values per Division 01 Section "Schedule of Values."
 - 8. Contract closeout requirements.
 - 9. Operation, Maintenance and Warranty Manuals.
 - 10. Certificates of Compliance.
 - 11. Project Record Documents.
 - 12. Operation and Maintenance Data.
 - 13. Extra materials or spare parts.

1.5 LEED SUBMITTALS

- A. Summary of Required Submittals. There are a number of submittals required to create the LEED Application. These submittals are provided in the related product sections; a summary of LEED related submittals is provided here for reference only.
1. Credit SSc7.1: Heat Island Effect, Non-Roof
 - a. Cut sheets for paving system surfaces highlighting the Solar Reflectance Index (SRI) of the installed materials.
 2. Credit SSc7.2: Heat Island Effect, Roof
 - a. Cut sheets for each roofing material that highlights the Solar Reflectance Index (SRI) of the installed materials.
 3. Credit WEc1: Water Efficient Landscaping
 - a. Cut sheets for irrigation equipment, including manufacturer information about distribution efficiency.
 4. Credit WEc3: Water Use Reduction
 - a. Cut sheets for all water consuming plumbing fixtures, with flow rates and/or metering volume highlighted.
 - b. Cut sheets for plumbing fixtures which do not consume water such as composting toilets or waterless urinals.
 5. Prerequisite EAp3: Fundamental Refrigerant Management and Credit EAc4: Enhanced Refrigerant Management
 - a. Cut sheets for all mechanical HVAC&R components highlighting refrigerant information.
 6. Credit MRc2: Construction Waste Management
 - a. Completed LEED Online Credit Form.
 - b. Construction Waste Management plan.
 - c. Construction Waste Management progress reports, including monthly photo documentation of construction waste management procedures and on-site bins.
 - d. Documentation of recovery rate, if commingled.
 - e. Waste hauling certificates or receipts.
 - f. Final Construction Waste Management Report as described in Section 017419 Construction Waste Management and Disposal.
 - g. Include a brief narrative explaining how and to where each waste type has been diverted

7. Credit MRc4: Recycled Content
 - a. Completed LEED Online Credit Form containing a list of all recycled content materials used on the project, and their cost.
 - b. Cut sheets or other documentation for each product/material highlighting recycled content information.
 - c. Completed LEED Materials Submittal Form (attached to this section) for each product used.

8. Credit MRc5: Regional Materials
 - a. Completed LEED Online Credit Form containing a list of all materials manufactured and harvested/extracted within 500 miles of the project site, their cost, and the location of manufacture and harvest/extraction.
 - b. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction.
 - c. Completed LEED Materials Submittal Form (attached to this section) for each product used.

9. Credit MRc7: Certified Wood
 - a. Certificate or other documentation for each FSC product/material highlighting the FSC Chain of Custody (CoC) number.
 - b. Invoices for all wood products purchased, with the following identified:
 - c. FSC certified wood products and the associated (CoC) number for each product.
 - d. Itemized costs for all wood products
 - e. Vendor FSC CoC number
 - f. Completed LEED Materials Submittal Form (attached to this section) for each product used.

10. Credit EQc3.1: Construction Indoor Air Quality Management Plan, During Construction
 - a. Completed LEED Online Credit Form.
 - b. Construction IAQ Management Plan.
 - c. Photographs of construction IAQ management measures such as protection of ducts and on-site stored or installed absorptive materials.
 - d. Cut sheets of filtration media used during construction and installed prior to occupancy with MERV values highlighted.

11. Credit EQc3.2: Construction Indoor Air Quality Management Plan, Before Occupancy
 - a. Completed LEED Online Credit Form.
 - b. Construction IAQ Management Plan, stating flush-out or air quality testing procedures.
 - c. Copy of IAQ testing results if testing is performed.

12. Credits EQc4.1 & EQc4.2: Low-Emitting Materials – Adhesives, Sealants, Paints, and Primers
 - a. Completed LEED Online Credit Form.
 - b. Completed LEED VOC Submittal Form attached to this section for each adhesive, sealant, paint, and primer product used inside the vapor barrier.
 - c. Material Safety Data Sheet (MSDS) highlighting VOC content for each adhesive, sealant, paint and primer product used inside the vapor barrier.
 - d. Summary table comparing credit requirements and actual VOC levels for each product.

13. Credit EQc4.3: Low Emitting Materials, Flooring Systems
 - a. Completed LEED Online Credit Form.
 - b. Cut sheets or letters from product manufacturers indicating that carpet products meet the CRI Green Label Plus IAQ Test Program requirements.
 - c. Cut sheets or letters from product manufacturers indicating that hard surface flooring products comply with the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.
 - d. Completed LEED Materials Submittal Form (attached to this section) for each product used.
 - e. Summary table listing each carpet used on the project.

14. Credit EQc4.4: Low-Emitting Materials, Composite Wood & Agrifiber Products
 - a. Completed LEED Online Credit Form.
 - b. Cut sheets indicating that the bonding agents for each composite wood and agrifiber product used in the project do not contain added urea formaldehyde resins.
 - c. Completed LEED Materials Submittal Form (attached to this section) for each product used.
 - d. Cut sheets indicating that the laminating adhesive products used in the project do not contain added urea formaldehyde.
 - e. Summary table listing each composite wood product used on the project. For each product, list the bonding agent used

1.6 LEED™ REPORTING FORMS

- A. Complete the forms listed below, and as required by other Sections.
 - 1. LEED Online Credit Form (see sample form at the end of this Section): PDF file that prompts the responsible party to declare that the requirements of each prerequisite and credit are met. This document can be accessed by registered users to the LEED Online application system.
 - 2. LEED Materials Submittal Form (see sample form at the end of this Section): Form to be provided to each subcontractor to record LEED materials used on the project.
 - 3. LEED VOC Submittal Form (see sample form at the end of this Section): Form to be provided to each subcontractor to record VOC content for all adhesives, sealants, paints and primers used on the inside of the vapor barrier of the project.

1.7 DEFINITIONS

- A. Submittals: Manufacturer's published product information, shop drawings, samples, certifications, guarantees, and the like as required by individual Specification Sections and as requested by Architect or Architect's consultant.
- B. Product Information: Manufacturer's published technical product information and data, including but not limited to the following: catalogs, catalog cuts, color charts, standard wiring diagrams, printed performance curves, operational range diagrams, mill reports, written installation instructions, standard operating and maintenance manuals, and other relevant information. Where product information must be specifically prepared because standard printed data is not suitable for use, submit as "shop drawings."
- C. Shop Drawings: Technical drawings and data, prepared by Contractor, required by the Specifications or the performance of the Work for this project including, but not limited to fabrication and installation drawings, setting diagrams, shop work manufacturing instructions, templates, patterns, coordination drawings (for use on-site), schedules, design mix formulas, Contractor's engineering calculations, and other relevant information.
- D. Samples: Physical examples of Work including, but not limited to partial sections of manufactured or fabricated Work, small cuts or containers of materials, complete units of repetitively-used materials, units of work to be used for independent inspection and testing, and other relevant information. Unless otherwise approved in writing by the Architect, samples shall be of the precise article, material, or finish proposed to be incorporated into the Work.

1.8 SUBMITTALS – GENERAL REQUIREMENTS OF CONTRACTOR

- A. Pay all costs for materials, reproduction, delivery, and distribution.
- B. Pay all costs for additional materials, reproduction, delivery, distribution, and impact on Time of Completion in the event that initial submittals are not approved for failure to comply with the project requirements and requirements of this Section, including content and format of submittal.

- C. Contractor's submittals reviewed by the Architect or Architect's consultant are not modifications to the Contract. The purpose of Contractor's submittals is to demonstrate to the Architect or Architect's consultant that the Contractor understands the design concept. Contractor demonstrates his understanding of the design by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
- D. Assume responsibility for satisfactory performance of the Work and for assuring that all materials furnished meets all requirements of the Contract Documents.
- E. Assume responsibility for checking, confirming, and correlating quantities, dimensions and space requirements at the Project Site, for selecting fabrication processes and techniques of assembly, for coordination of Work with other trades, for union jurisdiction, for infringement of patent rights, and for possible cause of injury to persons or property.
- F. Markings or comments by Architect or Architect's consultant on submittals shall not be construed as relieving the Contractor from compliance with the requirements of the Contract Documents, nor departures therefrom.
- G. Instruct affected parties to promptly report in writing any inability to comply with provisions of this Section.
- H. Architect or Architect's consultant's review of submittals is only for general compliance and conformity with the design concept and provisions of the Contract Documents. Any action indicated is subject to the requirements of the Contract Documents. Architect or Architect consultant's review of separate items does not constitute review of assembly in which it functions.
- I. Telegraphic and facsimile (FAX) submittals are not acceptable unless approved in advance by Architect. Telegraphic and facsimile transmittals shall be followed up with original copies as required.
 - 1. Electronically transmitted submittals in PDF or similar format are acceptable.
- J. Reproduced or copied Contract Documents as the basis for submittals are not acceptable, and if received as a submittal, will be rejected.
- K. In no case is the Contractor relieved of responsibility for deviations, errors, or omissions in any submittals which would, in effect, modify the Contract Documents or their "intent;" unless specifically brought to the Architect's attention and approved in writing. There is no implied change, approval or responsibility on the Architect in reviewing submittals and giving approval even when they may be unknowingly incorrect or incomplete in some portion.

1.9 SUBMITTAL PROCEDURES

- A. Submittal Scheduling:

1. Process and make submittals in such sequence in advance of scheduled dates of installation to expedite the project, to secure required approvals from public Authority Having Jurisdiction (AHJ), and as required to allow reasonable time (14 calendar days for each submittal or re-submittal unless indicated otherwise) for Architect's review. Allow additional time as required for review by Architect's consultants and/or possible revision and re-submittal.
 2. Allow sufficient time for the processing, transmitting, review, and return of submittals to cause no delay in the Work.
 3. Failure to make submittals to allow sufficient time for checking and review by Architect or Architect's consultant shall not entitle Contractor to an extension of Time of Completion, Substantial or Final.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Prior to transmitting submittal to Architect, fully coordinate all material including the following:
1. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.
 2. Coordinate preparation and processing of submittals with all trades, public agencies involved, and performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay. Obtain necessary approvals from public Authorities Having Jurisdiction (AHJ) and obtain written evidence of approval by stamp, letter, or other acceptable means.
 3. Make submittals in groups containing all associated or related items.
 4. Coordinate each submittal with fabrication, purchasing, testing, delivery, and other submittals and related activities that require sequential activity.
 5. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination. Architect and Architect's consultants reserve the right to withhold review-action on a submittal requiring coordination with other submittals until related submittals are received. Architect will advise the Contractor when a submittal being processed must be delayed for coordination.
- C. Contractor's Certification:
1. Apply Contractor's signed and dated stamp or label to each page of submittal, certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Contract Documents. Size of stamp or label shall be not less than 2 inches by 3 inches.

CONTRACTOR'S CERTIFICATION SHALL BE WORDED AS FOLLOWS:

"It is hereby certified that the material shown and marked in this submittal is that proposed to be incorporated into the Work under this Contract, is in compliance with the Contract Documents, can be installed in the allocated spaces, and is submitted for acceptance."

Certified by _____ Date _____

For: _____
(Contractor)

2. Submittals without evidence of Contractor's completed certification stamp will be returned to the Contractor without review. Resubmit with required certification stamp.
- D. Variation from Contract Documents: Furnish written description, separate from submittal, of how submittals vary from requirements of the Contract Documents.
- E. Submittal Identification, Log, and Transmittal:
1. Submittal Identification Numbers shall consist of the Specification Division Number and a 2-digit sequential number, separated by a hyphen (e.g. 09-01) Resubmittal Identification Numbers shall consist of the original Submittal Number followed by a sequential revision number (e.g. 09-01R1).
 2. Allow space on each submittal for Contractor's certification stamp and Architect or Architect's consultant's review-action stamp.
 3. Maintain a submittal status log for tracking submittals. List all submittals required and indicate actions required by Contractor, Owner, Architect, or Architect's consultant.
 4. Transmit each submittal separately with an individual Submittal Transmittal form signed by the Contractor. This form shall serve as cover sheet and transmittal and no additional paperwork shall cover this form. Attach additional sheet(s) if required.
 5. Transmit submittals for each Specification Section under separate transmittal form.
 6. Package each submittal appropriately for transmittal and handling. Submittals received from sources other than the Contractor will be returned without review-action unless approved by the Architect before submittal.
- F. Review-Action & Return of Submittals:
1. Architect or Architect's consultant will review each submittal, mark with a uniform, review-action stamp, appropriately marked to indicate status of submittal.
 - a. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken," or similar phrase, that part of the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents; final acceptance will depend upon that compliance.

- b. Final-But-Restricted Release: Where submittals are marked "Make Corrections Noted," "Revise As Indicated," or similar phrase, that part of the Work covered by the submittal may proceed provided it complies with the notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend upon that compliance.
- c. Returned for Re-submittal:
 - 1) When submittal is marked "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat as necessary to obtain a different action mark.
 - 2) When submittal is marked "Rejected," "Not Approved," or similar phrase, do not proceed with that part of the Work covered by the submittal including purchasing, fabrication, delivery, or other activity. Review cannot proceed because minimum requirements have not been met. Revise or prepare a new submittal in and resubmit without delay. Repeat as necessary to obtain a different action mark.
- 2. Do not permit submittals returned for re-submittal to be used in any part of the Work until Architect's release is obtained.
- 3. Where a submittal is primarily for information or record purposes, special processing, or other activity, the submittal will be returned to Contractor marked "Action Not Required."

G. Re-submittals:

- 1. Make corrections and changes in the submittals required by Architect or Architect's consultant.
- 2. Identify all revisions made on re-submittals.
- 3. Indicate other changes that have been made other than those required by Architect or Architect's consultant.
- 4. Resubmit until approved.

H. Distribution: Distribute approved copies of submittals to:

- 1. Project Site job file.
- 2. Record Documents file.
- 3. Other affected Contractors.
- 4. Subcontractors, Suppliers, and Fabricators.
- 5. Other affected parties, as appropriate.

1.10 PRODUCT INFORMATION

- A. Mark each submittal to identify applicable products, models, options, and other data. Delete inapplicable information. Supplement manufacturers' standard data to provide

pertinent information unique to this project. Furnish evidence of compliance with required reference standards.

1.11 SHOP DRAWINGS

A. General:

1. Present shop drawings in a clear and thorough manner.
2. Reproduced or copied Contract Documents or standard information as the basis for shop drawings are not acceptable, and if received as a shop drawing they will be rejected.
3. Freehand-drawn shop drawings are not acceptable.
4. Size of shop drawing sheets or PDF formatted sheets shall be not less than 8 1/2 inches by 11 inches and not more than 36 inches by 42 inches.
5. Draw plans and details to scale(s) not less than as indicated in individual Specification Sections, or, if not indicated, to a scale sufficiently large to clearly show all pertinent features, method of fabrication and connections.
6. Delete inapplicable information from manufacturer's standard schematic drawings and diagrams and supplement them as required to provide pertinent information unique to this project.

B. Include the following information:

1. Name of the firm that prepared each shop drawing.
2. Project identification.
3. Identification of products and materials and compliance with specified standards.
4. Indication by whom materials, items, and installation not supplied or performed by entity submitting shop drawings will be supplied or installed. Every item, material, article, or note on installation, shown or required for fabrication or installation shall be so designated. Do not use the expression "by others" or similar expressions.
5. Reference to Architect's or Architect's consultant's drawing and detail identification.
6. Relation to adjacent structure or materials.
7. Size, type, dimension, and location of all components, jointing, connections, and the like.
8. Fabrication methods, assembly, installation, accessories, fasteners, and other pertinent information.
9. Field dimensions, clearly identified.
10. Notation of coordination requirements.

C. Shop Drawings without required information will be rejected.

D. Submit in the form of three (3) opaque prints per shop drawing, unless submitted electronically in PDF or CAD format. Roll copies, do not fold.

E. Make number of required prints from approved copy for Contractor's, Subcontractors', Suppliers', Fabricators', and others' use (including that required for inclusion in operation and maintenance manuals as specified.

1.12 MANUFACTURER'S INSTRUCTIONS

- A. When required by individual Specification Sections and as requested by Architect or Architect's consultants, submit manufacturers' printed instructions for delivery, storage, assembly, installation, adjusting, and finishing of products to Architect for review and approval.
- B. Identify in writing conflicts between manufacturer's instructions and Contract Documents.

1.13 MANUFACTURER'S CERTIFICATES

- A. When required by individual specification Sections and as requested by Architect or Architect's consultants, submit manufacturers' certificates to Architect for review and approval.
- B. Indicate material or product complies with, or exceeds, specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates must be most recent test results on material or product, and must be acceptable to Architect or Architect's consultant.

1.14 SAMPLES

- A. Submit number of samples Contractor requires plus two (2) additional samples which will be retained by the Architect or Architect's consultant. When variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than three (3)), that show approximate limits of the variations. Provide additional sample as requested by Architect or Architect's consultant.
- B. Samples retained by Architect and Architect's consultant may be used for quality control comparison of visual characteristics between the final sample submittal and the actual Work as it is delivered and installed.
- C. Refer to individual Specification Sections for additional sample requirements that may be required for examination or testing of additional characteristics. Compliance with other requirements is the exclusive responsibility of the Contractor and such compliance is not considered in the Architect's or Architect's consultant's review and action indication on sample submittals.
- D. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices, to Architect for review and approval.
- E. Coordinate sample submittals for interfacing work.
- F. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect's selection, unless indicated otherwise in individual Specification Sections.
- G. Include identification on each sample, with full project information.

- H. In certain cases as required in the individual Specification Sections or as approved in advance in writing by Architect, samples too large for handling as outlined herein may be prepared and maintained at the project site. Architect may waive retention of sample at the time of completion and may waive required quantity requirements.
- I. Samples will be reviewed for visual qualities only. Compliance with other requirements is the exclusive responsibility of the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

See next page for LEED Submittal Templates

Materials Submittal Form

Project Name: _____

The project team is pursuing certification under the Leadership in Energy and Environmental Design (LEED) Green Building Rating System®. To fulfill the requirements of this program, this form must be completed for **each building material** (i.e. drywall, insulation, steel studs, etc) that you will be furnishing to the project. Wet-applied products are not included – please refer to the VOC Submittal Form.

Please fill out all of the information requested in the box below. Write "N/A" or "?" for information that does not apply or is undetermined. For questions about completing this form, please contact the general contractor for the project.

Sub-Contractor: _____	Spec Section: _____
Contact: _____	Material Name: _____
Date: _____	Manufacturer: _____
Material Cost (minus on-site labor and equipment): \$ _____	
Material Source Location:	
Location of Manufacture*:	_____ City/State
	_____ Miles from the project site
Location of Harvest/Extraction**:	_____ City/State
	_____ Miles from the project site
<input type="checkbox"/> I have attached manufacturer documentation stating the location of manufacture and harvest/extraction.	
Recycled Content†:	
% Post-Consumer:	_____ %
% Post-Industrial:	_____ %
(Combined total cannot equal >100%)	
<input type="checkbox"/> I have attached manufacturer documentation stating the percentage of recycled content.	
Signature:	Date:
_____	_____

* Manufacturing refers to the final assembly of components into a building product. For example, the location of manufacture for structural steel would be the address of the fabrication shop (not the steel mill).

** Location of Harvest is where raw materials were extracted from the ground. For example, the location of harvest for gypsum is the gypsum mine. If the gypsum is recycled, then the harvest location is the gypsum recycling plant.

† Post-consumer content is from previous consumer use (bottles, cars) and post-industrial content is recaptured from the industrial process (fly ash, metal trimmings). If the type of recycled content is not specified, assume it is post-industrial.

Materials Submittal Form Concrete

Project Name: _____

The project team is pursuing certification under the Leadership in Energy and Environmental Design (LEED) Green Building Rating System®. To fulfill the requirements of this program, this form must be completed for each different concrete mix that is used for the project.

Please fill out the information below. Gray boxes may be left blank. Write "N/A" or "?" for information that does not apply or is undetermined. For questions, please contact the contractor from whom you received this form.

Sub-Contractor: _____ **Manufacturer:** _____
Date: _____ **Contact:** _____

Concrete	Cost per cubic yard of mix (minus labor and equipment):	\$
	Volume of concrete provided (cubic yards):	CY
	Location of Manufacture ¹ :	City/State
		Miles from project site

Concrete Mix Name/Number: _____

Component ²	% of mix (by weight)	% Recycled Content ³ (Post-Consumer)	% Recycled Content ³ (Post-Consumer)	Location of Harvest ⁴ (City, State)	Miles from Project
Cement					
Flyash			100%		
Aggregate 1: _____					
Aggregate 2: _____					
Sand					
Other: _____					

I have included a manufacturer mix report that confirms the information in this chart.

Signature: _____ **Date:** _____

¹ Location of Manufacture refers to the address of the facility where the mix was combined.
² Water and chemical additives may be omitted from the component list.
³ Post-consumer content is from previous consumer use (ex: crushed pavement) and post-industrial content is recaptured from the industrial process (ex: fly ash). If the type of recycled content is not known, assume it is post-industrial.
⁴ Location of Harvest is where raw materials are extracted from the ground. For example, the location of harvest for aggregate is where the stone was mined. If the aggregate is recycled, then the harvest location is where the rock was crushed for recycling.

Materials Submittal Form Wood Products

The project team is using the LEED Rating System® (www.USGBC.org/LEED) to measure the environmental impacts of the project. Therefore, the project team is pursuing and tracking materials the types of materials that are being used to construct the project.

Please fill out the information in the box below for each wood material that you will be furnishing to the project. Write "N/A" in any field that does not apply and a "?" for any information that you are unable to determine.

Contractor: _____	Spec Section: _____
Contact: _____	Material Name: _____
Date: _____	Manufacturer: _____
Material Cost (minus labor and equipment): \$ _____	
<input type="checkbox"/> I have attached invoices for all wood products ¹ .	
<small>¹All invoices must: identify each wood product on a line-item basis; identify each FSC product on a line-item basis; include the dollar value for each line-item; and include the vendor's FSC Chain of Custody number if the invoice includes FSC items.</small>	
Material Source Location	
Location of Fabrication: City/State _____	Miles from project site _____
Location of Forest: City/State _____	Miles from project site _____
Recycled Content²	
Post-Consumer Content: _____ %	Pre-Consumer / Post-Industrial Content: _____ %
<input type="checkbox"/> I have attached manufacturer documentation stating the percentage of recycled content.	
<small>²Post-consumer content is waste that has been recaptured after consumer use. Post-industrial content is recycled waste that has been captured from industrial processes. If the type of recycled content is not specified, assume it is post-industrial.</small>	
Salvaged Wood Content³ _____ %	
<input type="checkbox"/> I have attached manufacturer information stating where the wood was salvaged from.	
<small>³Salvaged wood comes from the deconstruction of another building or structure.</small>	
FSC Certified Wood⁴	
Chain of Custody Certificate Number: _____	
<input type="checkbox"/> I have attached a copy of the FSC Chain of Custody Certificate or Manufacturer documentation stating the product or product component is FSC certified.	
<small>⁴Only Forest Stewardship Council (FSC) certification qualifies for LEED compliance. Sustainable Forest Initiative (SFI) or other certification bodies DO NOT QUALIFY and are not acceptable substitutions for FSC certification.</small>	
Composite Wood Content⁶	
Contains Urea-Formaldehyde Resins? _____ (Y/N)	
<input type="checkbox"/> I have attached manufacturer documentation stating that the composite wood DOES NOT contain any added urea-formaldehyde resins.	
<small>⁶Composite wood products include plywood, MDF, particleboard, wheatboard, bamboo, etc. Laminating adhesives used for shop fabrication and on-site fabrication of composite assemblies must also be free of added urea-formaldehyde resins.</small>	
Signature: _____	Date: _____

VOC Submittal Form

Project Name: _____

The project team is pursuing certification under the Leadership in Energy and Environmental Design (LEED) Rating System®. A major goal of this program is to reduce the quantity of indoor air contaminants that are odorous or potentially harmful to the well-being of installers and occupants. To fulfill the requirements of this program, **this form must be completed for each product that is wet-applied within the interior vapor barrier of the project.**

All products must be compliant with the Volatile Organic Compound (VOC) limitations that are reported on page two of this document. Please refer to the Pre-Approved Products List for product suggestions. If an alternative product is selected, please provide a copy of the Material Safety and Data Sheet (MSDS) with the VOC Submittal Form. The MSDS must state VOC content in **grams per liter**. If this information is not included in the MSDS, please request the VOC content (in grams/liter) from the manufacturer. Do not assume a zero VOC content if the information is not shown.

Please fill out the information in the chart below:

Sub Contractor: _____ **Spec Section:** _____

Contact: _____ **Date:** _____

I plan on using the following VOC containing Adhesives, Sealants, Primers and/or Paint on the interior of the project:

Product Name: (manufacturer and product ID)	Type of Product: (adhesive, sealant, paint, etc)	The product is used for: (application description)	VOC Content in g/L (from attached MSDS)	Allowable VOC Content in g/L (from charts on the next page)

I have attached a copy of the MSDS stating the VOC content for each product listed above.

By signing below, I hereby confirm that these are the only wet-applied products that I will use on the interior of the building.

Signature: _____ **Date:** _____

If you have any questions, please contact the general contractor.
 Thank you for complying with the LEED requirements and contributing to the goals of this project.

Submittal/Shop Drawing Transmittal

Instructions

- Contractor reviews and stamps the submittal. Complete Part 1 of this form, attach only (1) submittal specification section to each transmittal and distribute in accordance with project requirements.
- Architect's Consultants complete Part 2, attach annotated/stamped submittals and review comments and forward to NAC Architecture for distribution.
- Architect fills out Part 3 and returns to Contractor.

To	NAC Architecture 2025 First Avenue, Suite 300 Seattle, WA 98121	Project	WSH New Kitchen Commissary Pharmacy
		Date	
		NAC No.	121 - 16004 - 10G
		Owner Project No.	2016-410G (2-1)
		Spec Section	

Transmitted herewith Shop Drawing Product Data Samples **Submittal No.**

Manufacturer **Subcontractor/Supplier**

Copies Item Description (Drawing No., Date, Sample ID, etc.)

<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

All statements are assumed to be affirmed (indicated by a check mark) when compared to the specified item, unless specifically indicated otherwise.

- 1. The submitted item is identical to the specified product with regard to: size constraints; performance characteristics and capacities; same options or accessories without cost change; certification and testing standards; mechanical/electrical/other service connections and load requirements; guarantees/warrantees; in all other aspects.
- 2. The submitted item is the same manufacturer and model number or an approved substitute in Addenda #
- 3. The submitted item has the same impacts on other trades.
- 4. The submitted item meets all applicable code requirements.
- 5. This submitted item is asbestos free.
- 6. The submitted item is identical in all ways.

If all statements are not affirmed, explain why. (Use Alt + Enter to create new lines.)

If a substitution is made, Contractor is responsible for all impacts the substitution has on the project. (Use Alt + Enter to create new lines.)

Part 1



Submittal/Shop Drawing Transmittal

Part 2	To [Redacted]	Remarks [Redacted]
	From [Redacted]	Consultant [Redacted]
	Date Received by Consultant [Redacted]	[Redacted]
	Date Returned to Architect [Redacted]	[Redacted]
	Reviewed by [Redacted]	Recommended Action [Redacted]

Part 3	To [Redacted] Contractor	Architects review is for general conformance with the design concept and Contract Documents. If any deviations from the Contract Documents are included herein, such deviations shall be presumed by the Contractor as not having been reviewed by the Architects, except where specific attention is called to the change as a deviation. Markings or comments shall not be construed as relieving the Contractor from compliance with the project plans and specifications. The Contractor is responsible for details and accuracy, confirming and correlating all quantities and dimensions, fabrication processes, and techniques of construction, coordination of this work with that of all trades and the satisfactory performance of this work. (Use Alt + Enter to create new lines.)
	[Redacted]	
	[Redacted]	
	Date Received by Architect [Redacted]	
	Date Returned to Contractor [Redacted]	
	Action	
	<input type="checkbox"/> No Exception Taken <input type="checkbox"/> Rejected	
	<input type="checkbox"/> See Consultants Comments <input type="checkbox"/> Revise & Resubmit	
	<input type="checkbox"/> Note Markings on Drawing/Resubmission not Requested	
	Remarks	
Attached are [Redacted] copies / [Redacted] reproducible(s) for Contractor distribution to Subcontractor, supplier, Manufacturer or others as appropriate		
Copied to [Redacted]	By [Redacted]	



SECTION 013553 – SPECIAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This procedure governs Contractor requirements and actions when at the facility(s) associated with this project. Compliance with the requirements set forth herein is a contract requirement, and additional compensation for same will not be allowed. Subsections Included in this Procedure:

1. Definitions.
2. Applications.
3. Background Checks and Identification Badges.
4. Emergency Contact Information.
5. Western State Hospital Contractor Policies.
6. Adjacent Roadways and Contractor Parking.
7. WSH Security.

1.3 DEFINITIONS

- A. Contract Work: The scope of work as defined in the Project Documents.
- B. Contractor: the entity whom is signatory to execute the Contract Work.
- C. Superintendent: The person managing all aspects of the Contract Work on the site and at the location where the Contract Work is to be performed, and has authority to act as an Agent for the Contractor.
- D. Contractor Personnel: Any individual person, employed directly or indirectly by the contractor to perform work or provide services in connection with the work of this Contract.
- E. Owner: State of Washington, Department of Social and Health Services.
- F. Owner Representative: The person(s) designated by the Owner for liaison with the contractor.

1.4 APPLICATIONS

- A. These requirements apply to all Contract Work and Contractor Personnel related to the Contract Work
- B. All Contractor Personnel shall be required to submit personal identifying information and be subjected to a background check prior to being granted access to the location where

the Contract Work is to be performed. Information required is as indicated on the attached "Background Authorization" form.

- C. The Owner will issue identification badges to all contractor employees who pass the background check and have attended a campus security orientation class as outlined in Article 1.5 below. The badge will be worn on the outer clothing and in plain view at all times.

1.5 BACKGROUND CHECKS AND IDENTIFICATION BADGES

- A. Only the Contractor Personnel with an approved background check that have been issued a WSH badge will be permitted on the campus.
 - 1. At the Owners discretion, temporary badges may be issued for individuals related to the Contract Work that will be at the location of the Contractor Work only once for less than 8 hrs.
 - 2. Individuals delivering materials related to the Contract Work will not be required to have WSH badges but must be received at the location of the Contract Work by the Contractors Superintendent, whom will be in their direct presence and supervision, and will be responsible for them until they leave the area of the Contract Work.
 - 3. The project managers and superintendents for the General Contractor, Civil, Mechanical, Electrical and Framing/Sheathing subcontractors are required to complete a background check and compete a formal campus security orientation session (approximately 90 minutes in length) and obtain a WSH identification badge.
 - 4. Other construction personnel must successfully complete and pass the aforementioned background check and obtain an identification badge prior to beginning work on the WSH Campus. The Owner will arrange for group orientations at the project site for these individuals. The Owner will work directly with the Contractor to conduct these group training sessions for construction personnel on a regular basis to facilitate background checks and badging of all construction personnel.
- B. The Contractor will be responsible for submitting the DSHS "Background Authorization Form" and ensuring it is fully completed before submitting, for all Contractor Personnel utilizing the form following this section or a digital copy that can be obtain from the Owner Representative or by sending a request to: ocpbackgroundchecks@dshs.wa.gov.
- C. The Contractor will allow at least (10) work days for fully completed Background Authorization Forms to be reviewed and badges issued, pending satisfactory determination is made.
 - 1. After badges are ready to be issued, construction personnel shall attend a campus orientation class (class is approximately one-hour in length). The intent of the class is to provide those working on the campus with emergency procedures, instructions on how to interact with patients, and other pertinent information.

- D. The information provided will be used to conduct a background investigation on each proposed Contractor Personnel. Determination of approval or denial of an application will be based on DSHS Administrative Policy No. 18.63. Additional consideration of a denial based on this policy, at request of the Contractor may be considered at the discretion of the Owner based on extenuating circumstances, and requirements of the facility and the project.
- E. All completed Background Check Authorization forms to be submitted in PDF format to: ocpbackgroundchecks@dshs.wa.gov.

1.6 EMERGENCY CONTACT INFORMATION

- A. In the case of an emergency situation that requires owner involvement contact information and sequence of contacts will be provided at the Pre-Construction Meeting.

1.7 WESTERN STATE HOSPITAL CONTRACTOR POLICIES

- A. Identification Badges: All construction personnel will wear their Western State Hospital (WSH) identification badge while on hospital grounds in a visible manner (located at the front of the torso, at or above waist level) except when working within the construction perimeter. If a name badge is not immediately available, the employee must wear a temporary badge until a permanent badge is obtained. The photo must be visible at all times and remain unobstructed.
 - 1. Report a missing badge to your supervisor and the Security Department immediately.
- B. Tool Control: When working outside a secured construction area a physical inventory of tools shall be maintained to ensure that all tools are accounted for prior to entering and upon leaving the area where the work was performed.
 - 1. Any contractor who determines that a tool is missing will immediately report the loss to their supervisor or project manager and the Security Department.
- C. Prohibited Items and Substances: Bringing narcotics, intoxicating liquors, weapons, etc., into the institution or on its grounds is prohibited per RCW Chapter 9A.20.
- D. Confidentiality: Other than authorized construction related photos, photography is prohibited on the campus.
 - 1. When taking photographs ensure no patients or staff are visible.
- E. Emergencies: In the event of an emergency, call (253) 756-2692. **DO NOT CALL 911** as emergency responders report to the main security center, where they will be directed to the scene of the incident.

1.8 ADJACENT ROADWAYS AND CONTRACTOR PARKING

- A. Adjacent Roadways: Two-way traffic shall be maintained on the roadways on the south and east side of the project site (Sequoia Street and Circle Drive). Notify WSH three

weeks in advance of closures required for utility excavation, construction and connections.

1. The parking strip on the north side of Sequoia Street may be used for construction activities to the extent indicated on the Drawings.
- B. Contractor Parking: Overflow parking for badged construction personnel can be accommodated at parking lot P-5, located at the northwest corner of the campus. A Contractor-provided shuttle to transport construction personnel is recommended but not required.

1.9 WSH SECURITY

- A. To facilitate patient safety, and to provide security during non-construction hours, provide a space in a trailer located adjacent to the primary construction entrance for WSH security personnel. Coordinate location with the Architect and WSH staff. Space shall have power and heat. Telephone services are not required.
1. WSH security staff will visually inspect the site at the end of working hours to ensure tools have been adequately secured from patient access and/or theft.
 2. WSH security will not staff this space on a 24/7 basis.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013553

ss: November 29, 2017

dj: Noveber 21, 2017



Background Check Authorization

PROCESSING CODE
Initial Contract : OCP

SECTION 1. ENTITY INFORMATION (COMPLETED BY DSHS STAFF, PROVIDER, APPLICANT, LICENSEE, AND/OR CONTRACTOR)

1A. ENTITY REQUESTING THE BACKGROUND CHECK DSHS OSSD Office of Capital Programs	1B. ENTIRE ADDRESS OF ENTITY LISTED IN BOX 1A 1115 Washington St. SE; MS: 45848 Olympia, Washington 98504-5848	1C. NAME OF SECONDARY ENTITY Contractor: Project #2016-410G (2-1)
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2. **REQUIRED:** NAME AND SIGNATURE OF PERSON REQUESTING THE BACKGROUND CHECK

PRINTED NAME: _____ SIGNATURE: _____

3. **REQUIRED ONLY FOR DSHS STATE EMPLOYMENT**

DSHS POSITION NUMBER NA (WRITE NONE IF NONE) DSHS JOB CLASSIFICATION: _____ PERSONNEL IDENTIFICATION NUMBER: _____

Permanent appointment Non-permanent appointment Work study / student internship Volunteer Acting

4. REQUIRED: BCCU ACCOUNT NUMBER 1100391	5. DSHS ID NUMBER OR NAME NA
---	--

SECTION 2. THIS SECTION IS FOR APPLICANT INFORMATION ONLY (THE PERSON TO BE CHECKED IS THE APPLICANT)

6. SOCIAL SECURITY NUMBER	7. REQUIRED: DATE OF BIRTH (MM/DD/YYYY)	8. PRINT YOUR E-MAIL ADDRESS
---------------------------	--	------------------------------

9. **REQUIRED:** PRINT YOUR NAME AS IT IS LISTED ON YOUR DRIVER'S LICENSE OR OTHER PHOTO ID. WRITE N/A IN THE BOX IF YOU DON'T HAVE A NAME TO ENTER.

FIRST: _____ MIDDLE: _____ LAST: _____

10. **REQUIRED:** PRINT ALL OTHER FIRST, MIDDLE AND LAST NAMES YOU HAVE USED. WRITE N/A IN THE BOX IF YOU DON'T HAVE A NAME TO ENTER.

FIRST: _____ MIDDLE: _____ LAST: _____

REQUIRED: SELF DISCLOSURE QUESTIONS. SEE INSTRUCTIONS.

You must answer Questions 11A through 14. Attach an additional sheet of paper if you need to list additional crimes or pending charges.

11A. Have you been convicted of any crime? If yes, fill in the blanks below. _____ Yes No
Degree: _____ State: _____ Conviction date: ____/____/____

11B. Do you have charges (pending) against you for any crime? If yes, fill in the blanks below. _____ Yes No
Degree: _____ State: _____

12. Has a court or state agency ever issued you an order or other final notification stating that you have sexually abused, physically abused, neglected, abandoned, or exploited a child, juvenile, or vulnerable adult? _____ Yes No

13. Has a government agency ever denied, terminated, or revoked your contract or license for failing to care for children, juveniles, or vulnerable adults; or have you ever given up your contract or license because a government agency was taking action against you for failing to care for children, juveniles, or vulnerable adults? _____ Yes No

14. Has a court ever entered any of the following against you for abuse, sexual abuse, neglect, abandonment, domestic violence, exploitation, or financial exploitation of a vulnerable adult, juvenile or child? _____ Yes No

- Permanent* vulnerable adult protection order / restraining order, either active or expired, under RCW 74.34.
- Sexual assault protection order under RCW 7.90.
- Permanent* civil anti-harassment protection order, either active or expired, under RCW 10.14.

See instructions for description of "permanent."

15. REQUIRED: PRINT YOUR DRIVER'S LICENSE OR STATE IDENTIFICATION NUMBER (WRITE NONE IF NONE)	REQUIRED: PRINT THE NAME OF THE STATE ON YOUR LICENSE OR ID
--	--

16. **REQUIRED**
Have you lived in any state or country other than Washington State within the last three years (36 months)? Yes No

17. **A. REQUIRED:** PRINT YOUR MAILING ADDRESS WHERE WE CAN SEND YOU CONFIDENTIAL INFORMATION

APT. NO. _____ CITY _____ STATE _____ ZIP CODE _____

B. REQUIRED: PRINT THE STREET ADDRESS WHERE YOU LIVE NOW (WRITE "SAME" IF YOUR STREET ADDRESS IS THE SAME AS YOUR MAILING ADDRESS)

APT. NO. _____ CITY _____ STATE _____ ZIP CODE _____

C. REQUIRED: GIVE THE DAYTIME AREA CODE AND TELEPHONE NUMBER WHERE YOU CAN BE REACHED

18. I am the person named above. If I do not tell the whole truth on this form, I understand I can be charged with perjury and I may not be allowed to work with vulnerable adults, juveniles or children. I understand and agree my signature in box number 19 means:

- I give DSHS permission to check my background with any governmental entity and law enforcement agency.
- My background check result may include prior self-disclosure information and fingerprint results that are contained in the DSHS Background Check System and that this information will be reported as allowed by federal or state law.
- If a final finding is identified, DSHS will report only my name and that a final finding was identified on the background check result.
- DSHS will give my background check result to the persons or entities named in Section 1 and may release my background check results to other persons or entities when the law authorizes or requires DSHS to do so. Fingerprint rap sheets are provided if allowed by federal or state law.
- The entity requesting this background check must submit this form to the Background Check Central Unit within the timeframe required by the DSHS oversight program.

19. REQUIRED: YOUR SIGNATURE. YOUR PARENT OR GUARDIAN'S SIGNATURE IF YOU ARE UNDER 18.	20. REQUIRED: TODAY'S DATE (MM/DD/YYYY)
---	--

PROGRAM USE - FOLLOW INSTRUCTIONS PROVIDED BY YOUR DSHS OVERSIGHT PROGRAM

Instructions for Completing the Background Check Authorization
DSHS 09-653

These instructions provide general directions for completing the Background Check Authorization form. This form is used by multiple DSHS programs to meet varying background check needs. **The DSHS oversight program requiring the background check may have additional instructions that you must follow.**

The Background Check Central Unit (BCCU) **cannot** complete the background check unless all required boxes are complete. Required boxes have the word **REQUIRED:** next to the box number as shown in the example below:

4. REQUIRED: BCCU ACCOUNT NUMBER

IMPORTANT: If you do not provide all required information, your background check will be delayed.

ATTENTION ENTITIES AND DSHS STAFF: Only submit this authorization form once. Multiple submissions of the same authorization form causes delays in processing background checks.

PROCESSING CODE: If you use a priority processing code or “fingerprint required”, enter it in this box. Priority processing codes include new hire, initial contract, initial license, approved rush, Community Protection, and DSHS state employee.

SECTION 1: TO BE COMPLETED BY THE ENTITY REQUESTING THE BACKGROUND CHECK

This section must be completed by the **entity** requesting the background check. Entities are most often DSHS programs, hiring authorities, and external providers who submit background check requests to the Background Check Central Unit.

Box No. Instructions

- 1A Enter the name of the entity requesting the background check.
- 1B Enter the full address of the entity listed in Box 1A.
- 1C Enter the name of the secondary entity associated with the background check. A secondary entity may be a contractor, subcontractor, or other entity associated with this background check. Your oversight program will provide instructions on how to use this box.
- 2 Provide the printed name and signature of the person requesting the background check. This is the person who is submitting the background check on behalf of the entity listed in Box 1A.
- 3 Complete this box **ONLY** if the background check is for DSHS employment purposes. External providers should **not** complete this box.
- 4 Enter your BCCU account number in this box. You can find your BCCU account number at <http://www.dshs.wa.gov/fsa/bccu/account-numbers>. DSHS state employment account numbers are available on the BCCU intranet webpage.
- 5 Enter a DSHS ID number or name if required by your DSHS oversight program.

SECTION 2: TO BE COMPLETED BY THE APPLICANT

This section must be completed by the **applicant**. The applicant is the person whose background we are checking. Except as noted in these instructions, DSHS staff must not complete Section 2 for the applicant. Note: Adult Protective Services program staff may complete the applicant information for an APS investigation background check.

Box No. Instructions

- 6 You may choose to provide your Social Security Number. Your Social Security Number helps the Background Check Central Unit match your name and date of birth to existing records in our database and may speed up completion of your background check.
- 7 Print your date of birth listing the month, day, and year.
- 8 Provide an e-mail address where we can reach you.
- 9 Current Name: List your first, middle, and last name as they are listed on your current Driver’s License or other primary photo ID. (See example below.) Accepted government-issued photo ID includes any federal, state, or local government-issued ID, US military ID, US or foreign passport, or federally recognized tribal ID. Write **N/A** in each field that you do not have a name to enter.

9. REQUIRED: PRINT YOUR NAME AS IT IS ON YOUR DRIVER’S LICENSE OR OTHER PHOTO ID. WRITE N/A IN THE BOX IF YOU DON’T HAVE A NAME TO ENTER.		
FIRST: Susan	MIDDLE: Jane	LAST: Smith

- 10 Other Names: Print all other first, middle, or last names you have used. Other names include nicknames, birth names, maiden names, etc. If you have not used any other first, middle, or last names, you must enter **N/A** in the appropriate box. Do not leave any of the boxes blank. (See examples below)
Example 1 – entering two nicknames and one maiden name. No other middle names have been used.

10. REQUIRED: PRINT ALL OTHER FIRST, MIDDLE AND LAST NAMES YOU HAVE USED. WRITE N/A IN THE BOX IF YOU DON’T HAVE A NAME TO ENTER.		
FIRST: Sue, Susie	MIDDLE: N/A	LAST: Jones

Example 2 – entering N/A because no other first, middle, or last names have been used.

10. **REQUIRED:** PRINT ALL OTHER FIRST, MIDDLE AND LAST NAMES YOU HAVE USED. WRITE N/A IN THE BOX IF YOU DON'T HAVE A NAME TO ENTER.

FIRST: **N/A**

MIDDLE: **N/A**

LAST: **N/A**

See important information about answering self-disclosure questions following the description for Box 20.

Box No. Instructions

- 11A You must check **YES** or **NO**. If you check **YES**, you must enter the crime name, degree (if any), state, and the conviction date (MM/DD/YYYY). If you need to list additional convictions, attach a separate piece of paper to the Background Check Authorization form. Include your name and all the required information listed above.
- 11B You must check **YES** or **NO**. If you check **YES**, you must enter the pending charge name, degree (if any), and state. If you need to list additional pending charges, attach a separate piece of paper to the Background Check Authorization form. Include your name and all the required information listed above.
- 12-14 Read each question carefully before answering. You must check YES or NO. ***Question 14: Permanent means the order was issued either following a hearing or by stipulation of the parties.**
- 15 Enter your Driver's License or state-issued ID and the state where it was issued.
- 16 If you have continuously lived in Washington State without living in another state or country for the last three years (36 months), answer **NO**. If you have lived in any state or country other than Washington State within the last three years (36 months), answer **YES**.
- 17 17a - Enter your mailing address where BCCU can send you confidential information such as a copy of your background check results.
17b – Enter your street address if it is different than your mailing address. If your street address and mailing address are the same, enter **SAME**.
17c – Enter the daytime phone number where you can be reached.
18. Read the statements in Box 18. Your signature in Box 19 means you have read, understand, and agree to the statements listed in Box 18.
19. Sign your name as it is listed in Box 9. If you are not 18 years old, a parent or guardian must sign for you.
20. Enter the month / day / year (MM/DD/YYYY) you signed Box 19.

IMPORTANT INFORMATION ABOUT ANSWERING SELF-DISCLOSURE QUESTIONS: Your answers to self-disclosure questions become part of your background check history and are stored in the DSHS database. Self-disclosures are reported as part of your background check result like any other background check history we receive. It is important that your answers to self-disclosure questions are accurate and consistent. It is strongly recommended that you answer self-disclosure questions the same way each time you complete the Background Check Authorization form unless the question has changed or the previous answer was wrong. It is also recommended that you refer to charging papers, court records, or other official documents and that you list criminal convictions, pending charges, dates and other information exactly as they are listed in those documents.

If you have questions about the Background Check Central Unit background check process, contact BCCU at bccuinquiry@dshs.wa.gov or call 360-902-7555.



STATE OF WASHINGTON
Department of Social and Health Services
Western State Hospital

Contractor Badging & Key Issuance Guidelines

Step #1, Background Check and Clearance

1. Contact the Capitol Programs Manager assigned to your project, they will provide guidance on how to submit background checks and who to submit them to.
2. Once you have received electronic confirmation via email that background checks have cleared, proceed to step #2.

NOTE: Retain the electronic confirmation as you may be asked to provide it during steps 2 and/or 3, the date of clearance will be needed.

Step #2, Request for WSH Contractor Badge

1. Take headshot picture of each person(s) needing a badge, headshot picture should extend roughly 1-2" above the head to the upper torso. Each picture needs to be titled with the employee's first name, last name, company name and the date they cleared the background check.

(Example: John Doe_Company Name_Cleared 00/00/2016)

2. Send the headshot picture(s) to both email addresses and title the email as shown below:

Title of Email (subject line):

Contractor Badge Request_"Insert Your Company Name"_Date of Request

Send To:

Jerilee Brixey

Email: brixeye@dshs.wa.gov Telephone: 253.756.2328

WSH Badging Office

wshbadgerequest@dshs.wa.gov

3. Once the above steps are completed, proceed to step #3, WSH badges will only be issued upon completion of the site safety orientation.

Step #3, Schedule WSH Site Safety Contractor Orientation

1. Send an email to the WSH Training Department requesting contractor training; the body of the email needs to contain a bulleted list of names (first and last) with the employee(s) corresponding company name.

Title of Email (subject line)

Contractor Training Request_"Insert Your Company Name"_Date of Request_State Project Number

Send To

Daniel Gapsch:

Email: GAPSCDJ@dshs.wa.gov Telephone: 253.756.2782

Christie Smythe:

Email: SMYTHCM@dshs.wa.gov Telephone: 253.761.7656

2. You will be given a date and time to attend the safety orientation, upon completion of the safety orientation badges will be distributed. You will need to present a valid driver's license or approved, state issued photo I.D. to receive the WSH ID badge at the end of class.

If badges are not ready for distribution by the end of the safety orientation class, contact Jerilee Brixey to arrange a date/time to pick up the badges.

NOTE: If step 1 has not been completed and the employee has not been cleared, badges will not be issued or created.

Step #4, Key Issuance

- Contractors with an approved WSH photo badge containing an expiration date that is with-in the badges expiration period can freely check out the following keys:

Contractor Keys

- LL805 (Fire Extinguisher Box & Pull Station Key)
- WW1 (Common Interior Egress and Ingress)
- CT1 (Common Central Campus Exterior Egress Key)
- CT2 (Common East Campus Exterior Egress Key)
- MR1 (Maintenance Key)
- MR1A (Maintenance Key)



- Contractors needing access to restricted locations containing key cores not listed in step #4, line #1 will need to contact the Facility Coordination Office. Each key core on each door is stamped with a number; this number will need to be provided at the time of request.

Facility Coordination Office

Christine Campbell, Facilities Coordination Manager
 Email: CAMPBCHL@dshs.wa.gov Office: 253.879.7920

Joey Roberts, Facilities Planner 2

Email: ROBERJR@dshs.wa.gov Office: 253.512.5449 Cell: 253.442.4182

Western State Hospital

Training Center Entry

Key Department Entry Ground Floor, Room 03

Future Expansion

<p>Bld 1 - CMO Maintenance Main Office / Transportation Dept.</p> <p>Bld 2 - CMO Maintenance Storage</p> <p>Bld 3 - CMO Plumbing Dept. / Garage Shop / Glass Shop, Sign Shop, Paint Shop / Machine Shop</p> <p>Bld 4 - CMO Electric Dept. / Boiler House</p> <p>Bld 5 - CMO Laundry</p> <p>Bld 6 - Art Center / Infinity Center (Ground Floor) Auditorium Not In Use (1st Floor)</p> <p>Bld 8 - Library / Key Dept. / Quality Management</p> <p>Bld 9 - IT Dept. / Staff Office's</p> <p>Bld 10 - Hiring / Training Center, HMM Carpentry Shop</p> <p>Bld 11 - Commissary, CIBS</p> <p>Bld 12 - CMO Maintenance Machine Shop Storage</p> <p>Bld 13 - Pharmacy / Central Services</p>	<p>Bld 14 - Old Bakery</p> <p>Bld 15 - Green House / Industrial Hygienist</p> <p>Bld 16 - Java Site, Fashion Center, HMM Laundry, Forensic Evaluator Office's / Center Training</p> <p>Bld 17 - Treatment Mall C9 / Central Wards C8 & 7 / CIBS / Central Pharmacy / Pierce County Superior Court</p> <p>Bld 18 - Administration / Communication Center</p> <p>Bld 19 - Central Wards C3, C2 & C1 / HR Dept. / Medical Records (HIMS)</p> <p>Bld 20 - Central Wards C6, C5 & C4 / Labor Relations / Public Relations / Publications / Mail Room</p> <p>Bld 21 - South Hall Wards: S10, S9, S8, S7, S5, S4, S3 / South Hall Treatment Mall S1 & S6 / Staff Office S2</p>	<p>Bld 22 - Old Morgue</p> <p>Bld 23 - Chapel</p> <p>Bld 24 - Employee Health / Patient Financial Services</p> <p>Bld 25 - Legal Services / RSN Office's / Dept. of Assigned Council / North West Justice / Beauty Barber Shop</p> <p>Bld 26 - Vacant, Not In Use</p> <p>Bld 27 - HMM Wards W1-N & W1-S / W2-N Recovery Innovations / W2-S: Telecare</p> <p>Bld 28 - Center For Forensic Services: CFS Wards F1 - F8</p> <p>Bld 29 - East Campus: Wards E1-E8 Clinic / X-Ray / Dental / Labs / Physical Therapy</p> <p>Bld 30 - Container, Emergency Supplies</p> <p>Bld 31 - Container, Emergency Supplies</p> <p>Bld 32 - Inventory Control, CIBS</p>	<p>Bld 33 - CMO LHS Team</p> <p>Bld 34 - CMO Carpentry Shop</p> <p>Bld 35 - Maintenance Warehouse / Nurse Recrt. Center</p> <p>Bld 36 - Chiller Plant, CMO</p> <p>Bld 37 - Generator #1</p> <p>Bld 38 - Generator #2</p> <p>Bld 40 - Historic Cottage #1</p> <p>Bld 41 - Historic Cottage #2</p> <p>Bld 42 - Historic Cottage #3</p> <p>Bld 43 - Historic Cottage #4</p> <p>Bld 44 - Old Cottage #5 (Not Displayed on Map)</p> <p>Bld 45 - Old Cottage #6 (Not Displayed on Map)</p> <p>Bld 46 - Old Cottage #7 (Not Displayed on Map)</p> <p>Bld 48 - Old Cottage #9 (Not Displayed on Map)</p> <p>Bld 49 - Old Cottage #10 (Not Displayed on Map)</p>
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Stellacoom Boulevard

Revised: 10/20/2016

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 CONTRACTOR'S QUALITY CONTROL PLAN

A. General:

- 1. The Contractor shall establish a Quality Control Plan to identify, perform and record sufficient inspection and tests of all items of work, including that of subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. The Contractor shall:

- a. Perform all quality control tests as required by local law if more stringent than specific requirements of these Specifications,
- b. Establish this control for all construction except where the Contract Documents provide for specific compliance tests by testing laboratories or engineers employed by the Owner, in which case the Contractor shall be responsible for the coordination of such testing with the Work of the Contract, and,
- c. Provide assurance that all preparatory work performed under the Contract meets or exceeds required level of quality. Contractor's control system shall specifically include all testing required by the various sections of the Specifications.

- B. The Contractor shall designate a Contract Quality Control (CQC) Plan Administrator whose responsibility shall be the overall administration of the Plan as defined therein. The Administrator shall sign all reports, logs and other documents/forms related to the Plan, and in so doing shall certify the accuracy and completeness of the information contained therein.

C. Records:

- 1. Maintain on-site Quality Control Plan Records, organized by specification section, on appropriate forms for all inspections and tests performed. Maintain records of instructions received from the Architect and actions taken as a result of those instructions. These records shall include evidence that the required inspections or tests have been performed and their results (including type and number of inspections or tests, nature of defects, causes for rejection, etc.) proposed or directed remedial action, and corrective actions taken. Document inspections and tests as required by each section of the specifications. Quality Control Plan Records shall be readily available for review by the Owner and Architect.

D. Quality Control Plan:

1. Within ten (10) days of Notice of Award, furnish to Architect, with proposed Schedule of Values, a Quality Control Plan that shall include resumes of the Plan Administrator, Superintendent, Project Engineer and Project Manager, their specific Plan duties and responsibilities, as well as procedures, instructions, and records to be used. The Plan shall specifically include the following:
 - a. A list of control tests that the Contractor is to perform, or his subcontractors are to perform, under his coordination. Control tests shall be listed by Specification Section.
 - b. Contractor's surveyor.
 - c. Procedures for reviewing all Shop Drawings, Product Data, samples or other submittals before submission to Architect. Include procedures for obtaining required field measurements.
 - d. Method of documenting quality control operation, inspection, and testing including samples of proposed forms, logs, and daily reports.
 - e. Quality control activities schedule.

1.3 COORDINATION WITH OTHER ENTITIES

- A. Cooperate with other entities performing quality control activities.
- B. Provide samples of materials and design criteria as indicated and when requested.
- C. Provide other assistance, equipment, tools, and storage facilities as specified.
- D. Make arrangements with those entities and pay for additional, similar or related testing or inspection required for the Contractor's use or convenience.
- E. Coordinate quality control activities to avoid delay and to avoid the necessity of removing and replacing construction to accommodate testing and inspections.
- F. Notify the Owner's testing agencies fourteen (14) working days prior to anticipated commencement or completion of work which is to be tested or inspected, whichever is applicable (initial notification).

1.4 CONTRACTOR'S PRE-INSTALLATION QUALITY CONTROL

- A. Coordination of Work:
 1. Well in advance of the installation of every major unit of work which requires coordination with other work, the Contractor shall ensure that the unit of work can be installed and function as intended and required in conjunction with other work which has preceded or will follow. In the event of discrepancies or conflicts, the Contractor shall propose written resolutions, inform the Architect, and proceed with Architect's concurrence.

B. Pre-installation Meetings:

1. Contractor shall schedule, set agenda and conduct pre-installation meetings as required or necessary to assure quality control, and to confirm responsibilities of various parties. Contractor shall record minutes of meetings and distribute to attendees and other parties as deemed appropriate. Contractor shall notify Owner and Architect of all pre-installation meetings a minimum fourteen (14) days prior to scheduled meeting. Owner and Architect may attend Meetings.

C. Inspection of Conditions:

1. The Contractor shall require the installer of each major unit of work to (1) inspect the substrate to receive the work, (2) inspect the conditions under which the work will be performed, and (3) report in writing to the Contractor that the substrate(s) and conditions are either satisfactory or unsatisfactory. The installer shall not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to him, completion of corrections has been reported in writing to the Contractor, and Contractor has distributed same to Architect and Owner. Copies of written notifications shall be maintained in Contractor's field office, incorporated into the Quality Control Plan Records, organized by Specification Section.

D. Notice for Owner's Testing Lab:

1. The Contractor shall notify the Owner's testing laboratory, the civil engineer, and the Architect not less than 24 hours before work requiring inspection or testing is started (confirming notification).

1.5 CONTRACTOR'S INSTALLATION QUALITY CONTROL

A. Manufacturer's Instructions:

1. The Contractor shall comply with the Manufacturer's applicable instructions and recommendations for installation. To whatever extent these are more explicit or more stringent than Contract Document requirements, indicate in the Record Documents.

B. Inspection:

1. The Contractor shall inspect each item of material or equipment immediately upon delivery and immediately preceding installation. Contractor shall reject damaged or defective items.

C. Attachments and Connections:

1. Provide attachment and connection devices and methods for securing work properly as it is installed, true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions, building movements, and staff activity. Provide uniform joint widths in exposed work, organized for

best possible visual effect. Refer questionable visual effect choices to Architect for final decision.

D. Verify Dimensions:

1. Recheck measurements and dimensions of the work as an integral step of starting each installation. Maintain written record of confirmation of satisfactory findings, or describe unsatisfactory conditions and proposed resolution. Maintain written records of unsatisfactory conditions and resolutions when required.

E. Conditions for the Work:

1. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion that will ensure the best possible result for each unit of work in coordination with the entire work. Isolate each unit of work from non-compatible work as required to prevent deterioration. Maintain documentation attesting to same.

1.6 FIELD ENGINEERING

- A. The Contractor shall employ a professional engineer or land surveyor registered in the State of Washington and acceptable to the Owner and Architect.
- B. Engineer or surveyor shall be responsible for location of major site elements, installation of control stakes as required and final certification that finish grading has been completed within the tolerances specified. Coordinate all other field engineering of applicable subcontractors.
- C. Documentation and Records: Surveyor or engineer shall maintain a complete and accurate log of control and survey work as it progresses. On request of the Architect, submit documentation to verify accuracy of field engineering work.

1.7 PROJECT SURVEY REQUIREMENTS

- A. Reference Points: Immediately upon entering the project, locate and maintain bench marks and all other grades, lines, levels and dimensions. Report any errors or inconsistencies to the Architect before commencing work.
- B. Permanent Bench Marks: The surveyor or engineer shall establish a minimum of two permanent bench marks on the site, referenced to data established by survey control points.
- C. Preservation of Monuments and Stakes: Carefully preserve all monuments, bench marks, property markers, reference points, and stakes. In case of the destruction of these, the Contractor will be charged with expense of replacement and shall be responsible for any mistake, loss of time or additional expense that may be caused. Protect permanent monuments or bench marks that must be removed or disturbed until properly referenced for relocation. Furnish materials and assistance for proper replacement of such monuments or bench marks.

- D. Layout and Control: The surveyor or engineer shall establish lines and levels, locate and layout by instrumentation and similar means stakes for finish grading. He shall set control stakes and shall reset stakes as required during progress of the work. The surveyor or engineer shall provide the Architect with a shop drawing showing all new paved areas on the site with all radii, radii points, angles, segment lengths, and clearance dimensions called out and drawn to same scale as site plan. Paved areas shall include asphalt, concrete, curbs, and special surfaces.
- E. Completion: Upon completion of the work, the surveyor or engineer shall survey the site to verify that locations and elevations required by the Contract Documents have been achieved within the specified tolerances.
1. Submit to Owner a certificate signed by the surveyor or engineer certifying that elevations and locations are in conformance with the Contract Documents.
 2. Submit to Owner complete record "As-Built" Survey and Utility Plans, in both hard copy and electronic format.
- F. Refer to General Conditions for additional requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 014000

SECTION 014100 –ENVELOPE TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes: This section includes administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration or exfiltration of air.
 - 1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the building enclosure are called “the air barrier system”. Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.
 - 2. The Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:
 - a. It must be continuous, with all joints sealed.
 - b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
 - c. Connection shall be made between:
 - 1) Foundation and walls.
 - 2) Walls and windows or doors.
 - 3) Different wall systems.
 - 4) Wall and roof.
 - 5) Wall and roof over unconditioned space.
 - 6) Walls, floor and roof across construction, control and expansion joints.
 - 7) Walls, floors and roof to utility, pipe and duct penetrations.
 - 3. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be sealed.
- B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- C. Requirements of this section relate to the coordination between subcontractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not production of standard products.

1. Continuity of the air barrier materials and products with joints to provide assemblies. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.
2. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products. It is the Contractor's responsibility to ensure that each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each section.
3. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
4. Requirements for Contractor to provide an airtight building enclosure is not limited by quality-control services required by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

1.3 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. Provide quality assurance procedures, testing and verification as specified herein. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction or by the Owner. Costs for these services are included in the Contract Sum.
 1. Organize preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.
 2. Build a mock-up before proceeding with the work, satisfactory to the Architect, of each air-tight joint type, juncture, and transition between products, materials and assemblies.
- B. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
 1. Provide access to the Work.
 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 4. Deliver samples to testing laboratories.
 5. Provide security and protection of samples and test equipment at the Project Site.
- C. Duties of the Testing and Inspection Agency: The independent agency engaged to perform inspections, sampling, and testing of air barrier materials, components and

assemblies specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.

D. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 PERFORMANCE REQUIREMENTS

A. Compliance Alternatives:

1. Materials: Materials used for the air barrier system in the opaque envelope shall have an air permeance not to exceed 0.004 cfm/ft² under a pressure differential of 0.3 in. water (1.57psf) (0.02 L/s.m² @ 75 Pa) when tested in accordance with ASTM E 2178. Or;
2. Assemblies of materials and components: shall have an air permeance not to exceed 0.04 cfm/ft² under a pressure differential of 0.3 in. water (1.57psf) (0.2 L/s.m² @ 75 Pa) when tested in accordance with ASTM E 2357. Or;
3. The entire building: The air leakage of the entire building shall not exceed 0.4 cfm/ft² under a pressure differential of 0.3 in. water (1.57psf) (2.0 L/s.m² @ 75 Pa) when tested according to ASTM E 779.

B. Building Envelope Testing and Reports:

1. Comply with requirements per WSEC C402.4.1.2.3 Building Test for testing of the completed building envelope in accordance with ASTM E 779 or an equivalent method approved by the Code Official. Unless the Contractor is providing this service, an independent testing agency shall perform the envelope testing and submit certified written reports to the Owner, Architect, Contractor, and Code Official. The report must include at a minimum the tested surface area, floor area, air by volume, stories above grade, and the air leakage rates. If the tested rate exceeds that defined per WSEC C402.1.2.3, a visual inspection of the air barrier shall be conducted and any leaks noted shall be sealed to the extent practical. An additional report identifying the corrective actions taken by the Contractor to seal air leaks shall be submitted to the Owner, Architect, independent testing agency, and Code Official.

SUBMITTALS

- C. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

- A. Qualifications for Air Barrier Testing and Inspection Agencies: Engage air Barrier inspection and testing service agencies, including independent testing laboratories, that are prequalified and that specialize in the types of air barrier system inspections and tests to be performed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 TESTING AND INSPECTION

- A. The Owner will hire a testing and inspection agency to provide observation and inspection during installation of the air barrier system. The testing and inspection agency will provide the following listed services:
1. Qualitative Testing and Inspection:
 - a. Daily reports of observations, with copies to the Owner, Contractor and Architect.
 - b. Continuity of the air barrier system throughout the building enclosure with no gaps, holes.
 - c. Structural support of the air barrier system to withstand design air pressures.
 - d. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions and mortar droppings.
 - e. Site conditions for application temperature and dryness of substrates.
 - f. Maximum length of exposure time of materials to ultra-violet deterioration.
 - g. Surfaces are properly primed.
 - h. Laps in material are 2" minimum, shingled in the correct direction (or mastic applied on exposed edges), with no fish-mouths.
 - i. Mastic applied on cut edges.
 - j. Roller has been used to enhance adhesion.
 - k. Measure application thickness of liquid-applied materials to manufacturer's specifications for the specific substrate.
 - l. Materials used for compatibility.
 - m. Transitions at changes in direction, and structural support at gaps.
 - n. Connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
 - o. All penetrations sealed.
 - p. ASTM E 1186 "Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems."
 - 1) Infrared scanning with pressurization/depressurization.
 - 2) Smoke pencil with pressurization/depressurization.
 - 3) Pressurization/depressurization with use of anemometer.
 - 4) Generated sound with sound detection.
 - 5) Tracer gas measurement of decay rate.
 - 6) Chamber pressurization/depressurization in conjunction with smoke tracers.
 - 7) Chamber depressurization using detection liquids.
 2. Quantitative tests:
 - a. Provide written test reports of all tests performed, with copies to the Owner, Contractor and Architect.
 - b. Material compliance for maximum air permeance, ASTM E 2178.

- c. ASTM E 283, Determining rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen.
- d. Assemblies, ASTM E 2357, test pressure and allowable air leakage rate to be determined by design professional for interior design conditions and location of project.
- e. CAN/CGSB 1986 Standard 149.10, Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method.
- f. CAN/CGSB 1996 Standard 149.15 Determination of the Overall Envelope Airtightness of Office Buildings by the Fan Depressurization Method Using the Building's Air Handling System.
- g. Whole building, floors, or suites, ASTM E779, Determining Airtightness of Buildings Air Leakage Rate by Single Zone Air Pressurization.
- h. Windows and connections to adjacent opaque assemblies, ASTM E783 method B.
- i. Tracer gas testing, ASTM E741.
- j. Pressure test, ASTM E330.
- k. Bond to substrate, ASTM D4541.

END OF SECTION 014100

SECTION 014150 – AIR BARRIER SYSTEM QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes: Administrative and procedural requirements for providing an airtight building enclosure that controls infiltration and exfiltration of air and requirements for testing of building air tightness.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.

1.4 DEFINITIONS

- A. Air Barrier System:
 - 1. An air barrier system is a continuous assembly of interconnected components within the exterior enclosure of a building which prevents air flow across the assembly, caused by air pressure differential from one side of the assembly to the other.
 - 2. The air barrier system components of the building shall generally consist of the following:
 - a. Concrete foundation walls.
 - b. Membrane air barrier systems applied over sheathing.
 - c. Closed windows and doors.
 - d. Roof membrane vapor retarder.
 - e. Membranes and seals connecting air barrier system elements.
 - f. Seals around penetrations in the air barrier system elements.

1.5 SYSTEM DESCRIPTION

- A. Provide building enclosure with continuous air barrier systems to control air leakage into or out of the conditioned spaces to meet the specified performance requirements.
- B. The air barrier system shall have the following characteristics:
 - 1. It must be continuous, with all joints sealed.
 - 2. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
 - 3. Connection shall be made between:

- a. Foundation and walls.
 - b. Wall air barrier system assemblies and windows or door assemblies.
 - c. Different wall systems, including the connection of the liquid air barrier membrane applied over the gypsum sheathing systems and the liquid air barrier system applied to the backside of the precast concrete.
 - d. Roof vapor retarder.
 - e. Wall, floor, and roof assemblies at construction, control and expansion joints.
 - f. Wall, floor, and roof air barrier system assemblies to utility, pipe and duct penetrations.
4. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be sealed.
- C. Overall Building Envelope Performance Requirement: The air leakage of the entire building shall not exceed 0.4 cfm/ft² under a pressure differential of 0.3 in. water (1.57psf) (2.0 L/s.m² @ 75 Pa) when tested according to ASTM E 779.

1.6 SUBMITTALS

- A. Make submittals in accordance with Division 01 Section "Submittal Procedures."
- B. Assigned Staff: Submit the name of the staff members assigned to verify the air barrier systems and description of past work experience which qualifies them for the specified duties.

1.7 QUALITY ASSURANCE

- A. Air Barrier system Pre-Installation Conference:
 1. Administer a pre-installation conference in accordance with Division 01 Section "Project Meetings."
 2. Attendees: Architect, Envelope Consultant, Contractor, and all subcontractors installing air barrier system elements, including the following:
 - a. Sealant subcontractor.
 - b. Roofing subcontractors.
 - c. Flashing and sheet metal subcontractor.
 - d. Window and door installers.
 - e. Envelope consultant.
 3. Discuss air barrier system components and sequence of installation.
 4. Discuss all joints and penetrations and proposed methods for sealing.
 5. Identify and discuss all special conditions.
 6. Discuss exterior mock-ups.
 7. Discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.

8. Discuss testing requirements, including potential for testing in limited portions of the building.
- B. Assigned Contractor Staff: Assign a staff member, and at least one alternate, to be responsible for verifying that air barrier system components have been properly installed and that the area is ready for cover. Selected staff members shall have had experience in envelope construction.
- C. Mock Ups: Where mock-ups are required for exterior envelope components; incorporate mock-ups of air barrier systems to verify an air tight seal.
 1. Provide mockups for all exterior wall assembly types as indicated on the Drawings that provide exterior-to-interior envelope protection with a minimum area of 160 square feet including all windows and trim. Wall types that are indicated to provide exterior-to-exterior exposure are not required to be tested.
 2. *In place mockups that remain part of the construction are acceptable. (Addendum 2)*
- D. On-site Inspection:
 1. The air barrier system is subject to inspection by the Project Envelope Consultant.
 2. Provide a minimum of 48 hours notice prior to covering any air barrier system assembly.

1.8 CONTRACTOR RESPONSIBILITIES

- A. Coordinate and sequence the Work as necessary to ensure the final continuity of the air barrier system, including joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof.
- B. Provide quality assurance procedures and verifications as specified herein.
- C. Ensure the following:
 1. The air barrier system is continuous without gaps or holes.
 2. Air barrier system membranes are structurally supported to withstand design air pressures.
 3. Site conditions have been maintained for the application of air barrier system materials.
 4. Surfaces to receive membranes have been properly cleaned and primed.
 5. Laps in self-adhered membranes are 2" minimum, lapped to weather (or mastic sealed on exposed edges), with no fish-mouths.
 6. Self-adhered and liquid applied membranes are properly bonded.
 7. Thickness of liquid-applied materials meet manufacturer's specifications.
- D. Associated Services:
 1. Cooperate with agencies performing required inspections, tests, and similar services, and provide auxiliary services as requested.
 2. Provide access to the Work.

3. Furnish temporary construction and incidental labor and facilities necessary to support inspection and testing operations.
 4. Provide security and protection of assemblies and test equipment at the Project Site.
- E. Coordination:
1. Coordinate the sequence of activities to accommodate required services with a minimum of delay.
 2. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
 3. Schedule times for inspections, tests, sample taking, and similar activities.
- F. If testing shows that the building does not meet the specified overall building envelope air barrier system performance requirements, perform repair and reconstruction of the envelope assemblies as necessary to meet the specified performance requirements as approved by the Architect. Additional tests required to verify performance after repair and reconstruction shall be paid for by the Contractor without additional charge to the Owner.

1.9 FIELD TESTING

- A. The Owner may hire an independent testing agency to perform testing to verify that the building meets the specified air barrier system performance requirements.
- B. Qualifications for Air Barrier System Testing Agency: Independent air barrier system testing agency that specializes in and has the equipment for the types of air barrier system tests to be performed.
- C. The testing laboratory will be authorized to perform the following:
1. Submit a certified written report to the Architect, Owner's Representative, Envelope Consultant, and the Contractor after each testing operation.
 2. Written reports may include, without limitation, the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting.
 3. Duties of Testing and Inspection Agency:

- a. Provide qualified personnel to perform required inspections and tests.
- b. Coordinate with the Contractor as necessary to develop an effective air barrier system testing program for the Project.
- c. Notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
- d. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
- e. The agency may not perform any duties of the Contractor.

D. Full Envelope Testing:

1. The testing agency will test the completed building envelope air barrier system in accordance with the requirements of ASTM E779.
2. Provide all equipment and construction as necessary to perform the tests.
3. Make corrections and repairs to the building envelope and retest in accordance with the requirements of ASTM E779 until the building envelope meets the performance requirements specified.

1.10 REPAIR AND PROTECTION

- A. Upon completion of testing operations, repair damaged construction and restore substrates and finishes. Comply with requirements for Cutting and Patching described in Division One.
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014150

SECTION 014200 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term “indicated” refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specification, and similar requirements in the Contract Documents. Where terms such as “shown,” “noted,” “scheduled” and “specified” are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as “directed,” “requested,” “authorized,” “selected,” “approved,” “requested” and “permitted” mean “directed by the Architect,” “requested by the Architect,” and similar phrases.
- D. Approve: The term “approved,” where used in conjunction with the Architect’s action on the Contractor’s submittals, applications and requests, is limited to the Architect’s duties and responsibilities as stated in the General Conditions of the Contract.
- E. Regulation: The term “regulations” includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the work.
- F. Furnish: The term “furnish” is used to mean “supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation and similar operations.”
- G. Install: The term “install” is used to describe operations at project site including the actual “unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.”
- H. Provide: The term “provide” means “to furnish and install, complete and ready for the intended use.”
- I. Installer: An “installer” is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term “experienced”, when used with the term “Installer”, means having a minimum of ten(10) previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied requirements of the authority having jurisdiction.

2. Trades: Use of titles such as “carpentry” is not intend to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter.” It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.
- J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing laboratories: A “testing laboratory” is an independent entity engage to perform specific inspections or tests, either at the project Site or elsewhere, and to report on and, if require, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specifications Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute’s MASTERFORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
 1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Word that are implied, but not stated shall be interpreted as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the contract Documents so indicates.
 2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - a. The words “shall be” shall be included by inference wherever a colon (;) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standard in effect as of the date of the Contact Documents.

- C. **Conflicting Requirements:** Where compliance with two or more standards is specified, the standards may establish different or conflicting requirements for minimum quantities or quality levels, the more stringent requirements shall apply. Refer requirements that are different but apparently equal, and all uncertainties to the Architect for a decision before proceeding.
1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
 2. Without specific written guidance from the Architect, the Contractor should always assume the highest quality and/or quantity shall be provided.
- D. **Copies of Standards:** Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AA
Aluminum Association
900 19th St., NW, Suite 300
Washington, DC 20006 (202) 862-5100

ACI
American Concrete Institute
P.O. Box 19150
Detroit, MI 48219 (313) 532-2600

ACIL
American Council of Independent Laboratories
1725 K St., NW
Washington, DC 20006 (202) 887-5872

AIA
American Institute of Architects
1735 New York Ave., NW
Washington, DC 20006 (202) 626-7300

AISC
American Institute of Steel Construction
One East Wacker Drive, Suite 3100
Chicago, IL 60601-2001 (312) 672-2400

AISI
American Iron and Steel Institute
1133 Fifteenth St., NW
Washington, DC 20005 (202) 452-7100

AITC
American Institute of Timber Construction
11818 E. Mill Plain Blvd.
Vancouver, WA 98684 (206) 254-9132

ALSC
American Lumber Standards Committee
P.O. Box 210
Germantown, MD 20874 (301) 972-1700

ANSI
American National Standards Institute
1430 Broadway
New York, NY 10018 (212) 354-3300

AP
American Plywood Assoc.
P.O. Box 11700
Tacoma, WA 98411 (206) 565-6600

ARMA
Asphalt Roofing Manufacturers Assoc.
6288 Montrose Rd.
Rockville, MD 20852 (301) 231-9050

ASC
Adhesive and Sealant Council
1627 K Street, NW, Suite 1000
Washington DC 20006 (202) 452-1500

ASTM
American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103 (215) 299-5400

AWPA
American Wood Preservers' Assoc.
P.O. Box 849
Stevensville, MD 21666 (301) 643-4163

CISPI
Cast Iron Soil Pipe Institute
5959 Shallowford Road, Suite 419
Chattanooga, TN 37421 (615) 892-0137

FM
Factory Mutual Research Organization
1151 Boston-Providence Turnpike
Norwood, MA 02062 (617) 672-4300

MCAA
Mechanical Contractors Association of American
1385 Piccard Dr.
Rockville, MD 20832 (301) 869-5800

NAPA
National Asphalt Pavement Assoc.
Calvert Building, Suite 620
6811 Kenilworth Ave.
Riverdale, MD 20737 (301) 779-4880

NEC
National Electric Code (from NFPA)

NECA
National Electrical Contractors Assoc.
7315 Wisconsin Ave.
Bethesda, MD 20814 (301) 657-3110

NEMA
National Electrical Manufacturers Assoc.
2101 L. St., NW, suite 300
Washington, DC 20037 (202) 457-8400

NFPA
National Fire Protection Assoc.
P.O. Box 9101
Quincy, MA 02269-9101 (617) 770-3000

N.F.P.A.
National Forest Products Assoc.
1250 Connecticut Ave., NW, Suite 200
Washington, DC 20037 (202) 463-2700

NLGA
National Lumber Grades Authority
1055 W. Hastings St., Suite 260
Vancouver, BC Canada V6E 2E9 (604) 687-2171

NPCA
National Paint and Coatings Assoc.
1500 Rhode Island Ave., NW
Washington, DC 20005 (202) 462-6272

NRCA
National Roofing Contractors Assoc.
One O'Hare Centre
6250 River Road, Suite 8030
Rosemont, IL 60018 (708) 318-6722

PDI
Plumbing and Drainage Institute c/o Sol Baker
1106 W. 77th St., South Dr.
Indianapolis, IN 46260 (317) 251-6970

SDI
Steel Deck Institute
P.O. Box 9506
Canton, OH 44711 (216) 493-7886

SJI
Steel Joist Institute
1205 48th Ave. N., Suite A
Myrtle Beach, SC 29577 (803) 449-0487

SMACNA
Sheet Metal and Air Conditioning Contractors National Assoc.
P.O. Box 70
Merrifield, VA 22116 (703) 790-9890

SPRI
Single Ply Roofing Institute
104 Wilmot Rd., Suite 201
Deerfield, IL 60015 (708) 940-8800

TIMA
Thermal Insulation Manufacturers Assoc.
29 Bank Street
Stanford, CT 06901 (203) 324-7533

UL
Underwriters Laboratories
333 Pfingsten Rd.
Northbrook, IL 60062 (708) 272-8800

WCLIB
West Coast Lumber Inspection Bureau
P.O. Box 23145
Portland, OR 97223 (503) 639-0651

WWPA
Western Wood Products Assoc.
522 SW 5th Ave.
Portland, OR 97204-2122 (503) 224-3930

- F. Federal Government Agencies: Names and titles of federal government standard or Specification producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

CFR
Code of Federal Regulations
Available from the Government Printing Office
N. Capitol St. between G and H St. NW
Washington, DC 20402 (202) 783-3238

EPA
Environmental Protection Agency
401 M St. SW
Washington, DC 20460 (202) 382-2090

FS
Federal Specification (from GSA)
Specifications Unit (WFSIS)
7th and D St., SW (202) 472-2205
Washington, DC 20406 or (202) 472-2140

GSA
General Services Administration
F St. and 18th St., NW
Washington, DC 20405 (202) 472-1082

MIL
Military Standardization Documents
(U.S. Dept. of Defense)
Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120

OSHA
Occupational Safety and Health Admin.
(U.S. Department of Labor)
Government Printing Office
Washington, DC 20402 (202) 523-6091

1.5 GOVERNING REGULATIONS/AUTHORITIES

- A. The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents. Contact authorities having jurisdiction directly for information and discussions having a bearing on the work.

1.6 SUBMITTALS

- A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 014200

SECTION 014500 - EQUILIBRIUM OF RELATIVE HUMIDITY OF CONCRETE TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Provide independent ERHC testing and pH testing to all cast in place concrete specified to be covered with floor coverings or resinous coatings. Includes concrete placed below, on and above grade. Contractor shall coordinate his work to cooperate with the requirement for and schedule of independent testing of concrete at described herein.
- B. Testing shall take place after allowing concrete to dry for a minimum of 45 days. Testing to be scheduled to begin no less than eight weeks prior to the anticipated start of finished-flooring installation. Testing dates shall be included as a critical path item in the project CPM schedule.

1.3 REFERENCES

- A. ASTM F-2170-09 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using *in-situ* Probes
- B. ASTM F-710-08 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.4 SUBMITTALS

- A. Report all test results in chart form listing the manufacturer and model of testing meter used to monitor test sites including serial number, last calibration date and type, test start date, test monitoring date, test location and number, depth of each test site, ERHC reading at each site, concrete internal temperature reading at each site, the concrete surface temperature at each site, the concrete surface pH level at each site, a visual description of the concrete surface at each site (i.e. light trowel, hard trowel, burnished, rain-out, etc.).
- B. List test locations on chart and indicate the same on 8 ½ x 11 site map or printed floor-plan (when such map is made available to testing agency).
- C. Results will be furnished to the Owner, Architect, Contractor and Flooring Subcontractor.

1.5 QUALITY ASSURANCE

A. Independent Testing Agency:

1. FLOORinSPEC, Inc.
2020 Maltby Road PMB 114
Bothell, WA 98021
206-793-6720
2. Or firm certified by recognized industry training agency.

B. Relative Humidity Meters:

1. Commercially produced thermo-hygrometer specifically for use with ASTM F-2170-09 type testing, and meeting all requirements of ASTM F-2170-09 section 6.1
2. Must have verifiable calibration of instrument or sensor tip per the manufacturer's instructions (NIST traceable certification preferable).
3. Metering device and probes must comply with ASTM standards of size, sensitivity and calibration.

C. C. Monitoring pH:

1. Wide range pH paper, and distilled or de-ionized water.
2. Commercially manufactured pH meter for surface testing pH on top of solid and semi-solid materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Thermo-Hygrometers such as those manufactured by Lignomat, Delmhorst, Tramex, GE Protimeter or Vaisala Corporations; other meters must be approved prior to use.
- B. Wide Range pH test paper as manufactured by Micro Essential Laboratory, or equal.
- C. Commercial pH meters as manufactured by Extech; other meters must be approved prior to use.

PART 3 - EXECUTION

3.1 QUANTIFICATION OF EQUILIBRIUM RELATIVE HUMIDITY OF CONCRETE

- A. Conditioning: Concrete floor slabs shall be at service temperature and the occupied air space above the floor slab shall be at service temperature and service relative humidity for at least 48 hours before making relative humidity measurements in the concrete. If this is not possible, a stable minimum ambient air temperature of 65° - 85°F, slab temperature of 60° - 80°F, and an ambient rH of no greater than 60% shall be required. Report all testing conditions; continuous data logging equipment for recording ambient

temperature and humidity during the testing protocol is required for accurate interpretation of test data.

B. Procedure

1. The number of ERHC test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 square feet and 1 per each additional 1,000 square feet.
2. Perform the balance of all testing procedures specifically and exactly as outlined in ASTM F-2170-08, section 10.

3.2 QUANTIFYING PH LEVEL.

A. At each relative humidity test site and after monitoring of the site as outlined above, perform a pH test.

1. Wide Range pH Paper:

- a. Use a wire brush to remove all loose sediment or foreign matter from the surface of the concrete; if heavy contamination is present (i.e. paint, drywall mud, etc.) lightly sand the area to be tested with heavy grit sand paper to expose a clean, uniform concrete surface; do not use a mechanical grinding methods (i.e. hand-grinder with diamond cup-wheel) prior to testing pH as this may excessively remove developed surface qualities of the concrete (useful carbonation) and skew testing results.
- b. Place 6 – 10 drops of water onto the concrete surface to form a puddle approximately 1 inch in diameter.
- c. Allow the water to set for approximately 60 seconds.
- d. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading.

2. Meter: Perform steps a) through c) as above for the use of Wide Range pH paper; utilize meter instead of paper at step d) operating meter per manufacturer's instructions.

B. Record and report results.

END OF SECTION 014500

SECTION 014523 – TESTING AND INSPECTION SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.
 - 1. Refer to Division 01 Section “Summary of Work.”
 - 2. Refer to Division 01 Section “Project Coordination.”
 - 3. Refer to Division 01 Section “Quality Requirements.”

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements. The Owner reserves the right to take and analyze samples for conformity to contract Documents at any time.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, test and related actions specified are not intended to limit the Contractor’s quality control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the Owner or authorities having jurisdiction are not limited by provisions of this Section.

1.3 RESPONSIBILITIES

- A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and/or required by governing authorities, except where they are specifically indicted to be the Owner’s responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum. This includes work of sub-contractors.

1. The Contractor shall employ and pay an independent agency, to perform specified quality control services.
 2. The Owner shall engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.
 - a. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
 3. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services proved unsatisfactory and do not indicated compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
 - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required test were performed on original construction.
 4. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to:
 - a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 - c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - e. Security and protection of samples and test equipment at the Project site.
- B. Owner Responsibilities: The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicted as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.
1. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.
 - a. The Owner is intending to employ MTC Materials Testing and Consulting, Inc. for soils testing, (360) 755-1990.
 - b. The Owner has employed Welsh Commissioning Group for Commissioning, (253) 856-3322.

- c. The Owner has employed MTC Materials Testing and Consulting, Inc. as the testing and special inspections agency for this project, (360) 755-1990.
 - d. The Owner may contract for roofing and envelope inspection services.
 - e. The Owner may contract for paint inspection services.
- C. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
 3. The agency shall not perform any duties of the Contractor.
- D. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition to Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, test, taking samples and similar activities.
- 1.4 SCHEDULE OF TESTS AND INSPECTIONS BY OWNER APPROVED TESTING AGENCY (AT OWNER'S EXPENSE)
- A. Earthwork: Where compaction of disturbed soils is specified, test by probe and nuclear method is required.
1. Verify foundation subgrade conditions and ability to support recommended allowable bearing capacity.
 2. Verify preparation of subgrades beneath floor slabs, paved areas, and other improved areas. Observe proof rolling activities on prepared subgrades.
 3. Observe/monitor site excavation.
 4. Verify fill placement and compaction of fill and subgrade soils.
 5. Laboratory testing of proposed fill materials for grain size distribution criteria and to determine maximum dry density.
 6. Verify installation of subsurface drainage system.
 7. Observe installation of utilities and backfill placement and compaction.
 8. Observe site grading and subgrade preparation activities.
 9. Verify installation of Temporary Erosion and Sedimentation Control (TESC) components.
- B. Concrete: Reinforcing steel type, size and placement; concrete strength, placement/consolidation of concrete, embed anchors or bolts for size and pull-out resistance and other requirements noted by ACI, the Structural Drawings or the authority having jurisdiction.

- C. Masonry: Will be tested for mortar and grout strength; proper type, size and placement of reinforcing steel and consolidation of grout and other requirements noted by Masonry Institute, the Structural Drawings or the authority having jurisdiction.
- D. Steel, Bolting and Welding: Welders WABO certified. Visually inspect steel as well as shop and pre-fabricated welds at the fabricator. Visually inspect field welds on-site. Compliance to I.B.C. required. Visually inspect correct embed, cleaning, and placement for expansion and epoxy type anchors. Inspect shear connectors and bolting.
- E. Roofing: Owner may provide full time roofing inspection. Roofing manufacturer's representative shall provide inspection as necessary for issuing roofing warranty.
- F. Owner may, at their option, engage paint inspection services.

1.5 SUBMITTALS

- A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, the Architect, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 - 2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample-taking and testing.
 - k. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting.
 - n. Name and license or registration number of trades person performing the work being tested if that type of qualification/skill affects the quality of the work.

1.6 QUALITY ASSURANCE

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the

American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminated deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 014523

SECTION 014554 – BUILDING ENVELOPE AIR BARRIER TESTING PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes: Administrative and procedural requirements for air leakage testing of building envelope including:
 - 1. Building envelope pressurization and depressurization testing.
 - 2. Infrared thermography testing.

1.3 REFERENCES

- A. Reference Standards: Current edition and conforming to provision of Division 01 Section “Reference Standards and Definitions.”
- B. Air Barrier Association of America (ABAA): <http://www.airbarrier.org/>.
- C. American Society for Non-Destructive Testing (ANST): <https://www.asnt.org/>.
- D. ASTM International (ASTM): <http://www.astm.org/>.
 - 1. ASTM C1060 - Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings.
 - 2. ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
 - 3. ASTM E 1186 - Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
 - 4. ASTM E1827 - Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door.
- E. US Army Corps of Engineers (USACE), Engineer and Development Center:
 - 1. USACE Air Leakage Test Protocol for Building Envelopes.
- F. National Environmental Balancing Bureau (NEBB): <http://www.nebb.org/>.
 - 1. NEBB - Procedural Standards for Building Enclosure Testing (First Edition – 2013).
- G. Washington Association of Building Officials (WABO), Washington State Building Code Council:
 - 1. Washington State Energy Code (WSEC) [2009] [2012] edition. Website <http://wabo.org>.

1.4 DEFINITIONS

- A. Air Barrier Accessory: Products designated to maintain air tightness between air barrier materials, air barrier assemblies, and air barrier components. Includes sealants, tapes, backer rods, transition membranes, nails/washers, ties, clips, staples, strapping, and primers.
- B. Air Barrier Material: Primary element that provides designated plane of reduced air flow between different environments.
- C. Air Barrier Assembly: Combination of air barrier materials and air barrier components designed to provide a designated plane of reduced air flow between environmental separators at portions of building envelope system.
- D. Air Barrier Component: Pre-manufactured elements including windows, doors, and service elements installed in an environmental separator.
- E. Air Barrier System: Combinations of air barrier assemblies providing designated planes of reduced air flow between different environments of a building envelope system.
- F. Environmental Separator: Portions of building envelope that separates controlled interior environments from uncontrolled exterior environmental separators and areas of separation between spaces within building that have dissimilar environments.
- G. Air Leakage Rate: Rate of air flow in liters per second (L/s), per unit area in square meters (m²), per unit of static pressure differential in pascals (Pa).
- H. Air Permeance Rating: Quantitative measure of air diffusion through set surface area of material within a given time period under pressure differential between two sides of a material (in liters per second per square meter).
- I. Building Envelope and Building Enclosure: These have essentially the same meaning and apply specifically to a continuous boundary or barrier, including perimeter floor, wall, and roof assemblies, separating interior building environmental conditions from surrounding outside/exterior environment.
 - 1. Building Enclosure: May also apply to interior environmental separators.
 - 2. Building Envelope: Used by Washington State and Seattle Energy Codes.
- J. Building Envelope/Enclosure System: Provide a continuous, unbroken air barrier system surface area, including floors, walls/fenestrations, roof/ceiling areas, and multiple zones at interior functional air barrier enclosures.
 - 1. Contractor to submit plans and drawings indicating proposed testing methods and areas.
- K. Water Vapor Permeability: Coefficient of permeance to unit film thickness. Do not use except where film thickness is known and material is homogeneous.
- L. Water Vapor Permeance: Ratio of unit water vapor transmission ratio (WVTR) to vapor pressure between two parallel surfaces of a flat material of known thickness.

- M. Water Vapor Transmission Rate (WVTR): Steady water vapor flow in unit time through unit area of between specific parallel surfaces of a material, under specific conditions of temperature and humidity at each surface.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Conform to Division 01 Section “Project Coordination” for coordination with work of other Sections for following:
 - 1. Cooperate with testing and inspection agencies.
 - 2. Prepare building for testing and maintain testing conditions until testing completion.
 - 3. Notify testing agency minimum 5 working days prior to testing to allow time for assignment of personnel and scheduling of tests following installation of air tight transitions between air barrier wall assemblies, air barrier wall components, and roofing assemblies.
 - 4. Reimburse Owner or Inspection Agency where, without notification to testing agency, conditions are unsuitable or unavailable for scheduled testing and testing agency personnel made arrangements and arrived on site.

- B. Preinstallation Meeting: Arrange in conformance to requirements of Division 01 Section “Project Meetings.”
 - 1. Attendance: Contractor, installer, Owner, Architect, air barrier manufacturer’s representative, designated testing agency, installers representing related work, and those requested to attend.
 - 2. Location: Project Site.
 - 3. Agenda:
 - a. Attendance at air barrier mock-ups.
 - b. Responsibilities at transitions between air barrier assemblies and components.
 - c. Procedures for preparation and conducting air leakage testing.
 - d. Orifice blower door pressurization and thermal testing.
 - e. Closing and sealing of windows, doors, ducts, plenums, and building areas of separation.

- C. Sequencing and Scheduling: Conform to Section 013216 to meet Critical Path of Construction Progress Schedule:
 - 1. Sequence, and schedule construction activities to allow testing and inspections to proceed without interruption or conditions resulting in inconclusive results.
 - 2. Arrange time period for conducting air barrier testing after penetrations of air barrier system are complete and prior to covering and becoming inaccessible due to subsequent construction.
 - 3. Close building access to non-testing personnel and suspend construction activities to allow unimpeded air leakage testing.

1.6 QUALITY ASSURANCE

- A. Air Barrier Testing Agency: Performing testing and investigations of whole building envelope prior to closing off access to completed building air barrier system:
 - 1. Specializing in work of this Section. Able to show minimum 2 years' experience testing to determine air leakage of air barrier assembly.
 - 2. Provide qualified personnel to perform testing and inspections required under work of this Section.
 - a. Continuous Air Barrier Pressure Testing Personnel: Able to documented minimum 2 years of experience testing to ASTM E779 or ASTM E1827.
 - b. Infrared Thermographer: ANST Level II Certified to perform infrared diagnostic evaluation or documented minimum 2 years' experience performing building infrared thermography equivalent in scope and quality as specified by this Section.

1.7 SUBMITTALS

- A. Submit under provisions of Division 01 Section "Submittal Procedures."
- B. Qualification Data: Testing Agency and testing personnel qualifications conforming to or exceeding specified qualifications.
- C. Testing Plan and Procedures: Testing plan and procedures. Include a complete set of report forms and sample documentation conforming to ASTM E779 or ASTM E1827 procedures.
- D. Test Report: Indicate a pass or fail test result. Include testing calculation of air leakage using air flow measurements, tracer gas detection, thermal images, and other tests documenting locations and types of air leakage.

1.8 CLOSEOUT SUBMITTALS

- A. Submit under provisions of Division 01 Section "Closeout Procedures."
- B. Record Documentation: Maintain copies of inspections, testing, and laboratory reports at Project Site as Project Record Documents and submit to Owner and authorities having jurisdiction.

1.9 FIELD CONDITIONS

- A. Ambient Conditions: Perform testing during conditions of calm winds, moderate temperatures, and low exposure to direct solar radiation as necessary to increase precision of test results.
 - 1. Wind Velocity: Maximum 15 mph (6.7 m/s).
 - 2. Temperature Difference: Minimum 10 degrees F (7.8 degrees C) between average exterior and interior building temperatures.
 - 3. Solar Radiation: Do not conduct thermal imaging testing of surfaces exposed to direct sunlight. Consider testing after sunset or prior to sunrise.

4. Do not test in conditions where pressure gradients at building envelop caused by interior/exterior temperature differences, wind speed, and solar exposure are impractical for obtaining precise test results.

B. Temperature Factor due to Stack Effect:

1. Determine influence on building enclosure pressure due to building height and temperature factor.
2. Consider conducting orifice blower door test to ASTM E1827 where indoor/outdoor air temperature difference multiplied by building height exceeds a temperature factor of 2,360 foot degrees F (400 m degrees C).

PART 2 - PRODUCTS

2.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminated deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminated deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 014554

SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF REQUIREMENTS

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection. Contractor is to pay all costs associated with items listed.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Temporary heat and humidity control.
 - 4. Ventilation.
 - 5. Telephone and facsimile service.
 - 6. Data and internet service.
 - 7. Photocopier service.
 - 8. Sanitary facilities and services, including drinking water.
 - 9. Storm and sanitary sewer.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage sheds.
 - 2. Temporary roads and paving.
 - 3. Dewatering facilities and drains.
 - 4. Temporary enclosures.
 - 5. Hoists and temporary elevator use.
 - 6. Temporary project identification signs and bulletin boards.
 - 7. Waste disposal services.
 - 8. Construction aids and miscellaneous services and facilities.
 - 9. First aid station.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection and fire watch.
 - 2. Barricades, warning signs, directional signs and lights.
 - 3. Secure enclosure fence for the site and/or work areas.
 - 4. Landscape protection.
 - 5. Environmental protection.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building codes requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department and rescue squad rules.
 - 5. Environmental protection regulations including, but not limited to, control of storm water runoff, dust and noise.
 - 6. State Department of Labor and Industries, WISHA and OSHA requirements.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
 - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services," as prepared jointly by AGC and ASC for industry recommendations.
- D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.
- C. The Contractor shall provide free, safe and unencumbered access on or across the site for personnel, vehicles and equipment authorized to use the site by the Owner but not under contract of the Contractor.
- D. The Contractor shall assure free, safe and direct access to properties neighboring the site for owners of such properties, their guests, emergency and service/ delivery vehicles, where such access is by means of public streets or easement across the Owner's properties.

- E. The Contractor shall maintain streets and sidewalks around the project site in a clean condition. By means of a regular monitoring and maintenance program of sweeping and hosing, minimize the accumulation of dirt and dust on said areas.
- F. The Contractor shall protect all adjoining private or municipal property and shall provide barricades, temporary fences and covered walkways to protect the safety of passers-by, as required by prudent construction practice, local building codes, ordinances, other laws or the Contract Documents. The Contractor shall be responsible for preparing and submitting a traffic control plan, and right-of-way use applications to the City of Lakewood as necessary for the work.
 - 1. It is not anticipated work will be required on or within City of Lakewood right-of-ways. The Contractor shall observe haul routes identified, and if not identified confirm acceptable haul routes with the City of Lakewood and the Owner.
- G. The Contractor shall, at its sole cost and expense, promptly repair any damage or disturbance to walls, fences, utilities, sidewalks, curbs, landscaping and any other property of third parties (including municipalities) or work already existing resulting from the performance of the Work, whether by it, or by its subcontractors at any tier. The Contractor shall maintain streets in good repair and traversable condition.
- H. The Contractor shall maintain both new and existing Work, materials and equipment free from injury or damage from rain, wind, storms, dust, frost or heat at all times.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. General: Provide new materials. If acceptable to the Architect/Engineer, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials of suitable size and type for use intended.
- B. Lumber and Plywood:
 - 1. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated or 5/8 inch thick if not indicated.
 - 2. For safety barriers, sidewalk bridges, and similar uses, provide minimum 3/4-inch- thick exterior plywood. Thicker and stronger material shall be used as hazards require.
- C. Tarpaulins: Provide heavy duty, waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins. Tarpaulins with noticeable cuts, leaks or soiling must be promptly replaced. Provide tie downs, weighting or other methods sufficient to keep units in place, without flapping, in heavy winds.
- D. Water: Provide potable water approved by local health authorities.

- E. Open-Mesh Fencing: Provide 11 gage, galvanized 2-inch mesh chainlink fabric fencing minimum 6 feet high. For in ground installation use galvanized steel pipe posts, 1-1/2 inches I.D. for line posts and 2-1/2 inches I.D. for corner posts. Where portable fencing is used, same gage, mesh and height but posts may be as standard for fencing system and shall seat tightly in concrete or other solid foundation blocks designed solely for use with fencing. Fencing shall be securely bolted or chained against unauthorized entry at all section joints and corners. Use of barbed, razor or electrified wire is not allowed.
1. Fencing at the perimeter of work, storage and staging areas shall be maintained on an on-going basis to prevent patient and public access at all times.
 2. Provide visual screening fabric on fencing facing adjacent public and right-of-way areas. Screening is not required where temporary fence faces wooded areas.

2.2 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect/Engineer, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water: Existing water services on the site may be used for construction activities. Connection to hydrant identified on Civil drawings must include backflow prevention and metering. Provide water service as required by the work including all piping, trenching/ backfilling, valves, pressure reducing stations, taps and hose bibs. Provide water for both drinking and construction use and protect service from freezing.
1. Drinking water: Provide in single serving containers or by sanitary drinking fountains that are not used for other construction purposes.
 2. Hoses: Provide 3/4-inch (19-mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge. Hoses with active leaks are to be promptly repaired or replaced.
- C. Electricity: Obtain necessary temporary service and transformers from local utility as required to adequately power Project for all activities including, but not limited to: lighting, heating/cooling, ventilation, humidity control, and equipment/ tool power.
1. Electrical Distribution: Install panels, over current protection, circuits, breakers and distribution boxes to provide adequate and convenient service throughout the area(s) of the Work.
 2. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
 3. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

- D. Lighting: Provide general service lamps of wattage required for adequate illumination for Work, general access/ egress and security. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior, wet location fixtures where exposed to moisture.
- E. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed. Propane or gasoline fueled heaters, open flame heaters or "Salamanders" are not acceptable except on a case by case basis approved by the Architect/ Engineer in advance and in writing. Where heat is required for proper cure, drying or other necessary aspect of the Work, and where the fuel source requires periodic replenishment, the Contractor shall assign personnel to monitor such devices for proper operation and refuel them as necessary in work and non-work (evening/ weekend/ holidays) periods. Use of permanent units existing or provided under this contract is not permitted.
- F. Humidity Control Units: Provide temporary humidity control units that have been tested and labeled by UL, FM, or another recognized trade association. Where humidification or dehumidification is required for proper cure; drying; keeping the Project on schedule or other necessary aspect of the Work, and where the fuel source requires periodic replenishment, the Contractor shall assign personnel to monitor such devices for proper operation and refuel them as necessary in work and non-work (evening/ weekend/ holidays) periods.
- G. Ventilation Control Units: Provide temporary ventilating units that have been tested and labeled by UL, FM, or another recognized trade association. Where ventilation is required for proper cure; drying; worker or Occupant safety and comfort; keeping the Project on schedule or other necessary aspect of the Work, and where the fuel source requires periodic replenishment, the Contractor shall assign personnel to monitor such devices for proper operation and refuel them as necessary in work and non-work (evening/ weekend/ holidays) periods. Use of permanent units existing or provided under this contract is not permitted.
- H. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
1. Provide office space adequate for all Contractor offices, job site meetings to accommodate 16 participants minimum, and superintendent's office.
- I. Owner's Field Office (separate from Contractors): Provide a 120 square foot secure space within a construction office trailer (may be a space within the Contractor's trailer) with a lockable entrance, operable window, and serviceable finishes; heated and air conditioned. Provide a desk, file cabinet, chair, side chair, and internet access.
- J. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical or aerated recirculation type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Units to have privacy locks and to not have other types of locks that might allow personnel to be locked in.

- K. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
 - 2. Consult local Fire Marshall and appropriate Insurance Carrier for adequacy of protection provided and adjust as recommended.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - 1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 - 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect, and will not be accepted as a basis of claims for Change Orders.
- B. Water Service: Install water service and distribution piping of sizes, at locations and pressures adequate for construction until permanent water service is in use.
 - 1. Sterilization: Sterilize temporary water piping prior to use.
 - 2. Water safety: Maintain all supplies so as to provide clean and fresh water. Do not allow leaks, overflows or other events to allow the accumulation of open containers, puddles or ponds of water that could become brackish, foul smelling or otherwise bothersome and/ or be a possible drowning or health hazard or any sort of nuisance to site users or neighboring properties.

- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
1. Where existing services are underground provide temporary electric power service underground. Where existing services are overhead, temporary service may be overhead.
 2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
 2. Do not allow lighting to cause glare or bothersome spillage onto neighboring properties, Owner occupied portions of the site or public right of ways.
 3. Occupant Safety Lighting: Where the Work requires, or it is to the Contractors convenience, removal of existing site, parking, walkway, exit pathway, exit signs, emergency lighting or other lighting that provides site or building users with a certain level of safety and security, other temporary lighting sources shall be provided to ensure the same or a greater level of safety and security.
- E. Temporary Heat and Humidity Control: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
1. Concrete slabs moisture content: Concrete slabs will be subject to independent testing to verify moisture content is suitable for the installation of finish flooring products.
 2. Readings which exceed the values indicated as acceptable in the Division 01 Section "Equilibrium Relative Humidity of Concrete Testing" shall become the responsibility of the General Contractor who shall take corrective actions, i.e. additional heat, dehumidification, acid wash, etc. to bring the slab into the acceptable level. This action shall be accomplished with no additional cost to the Owner.
- F. Temporary Communications Devices: Provide temporary telephone, answering machine, photo copier, facsimile, and internet service throughout the construction period for all personnel engaged in construction activities. Note that wired connections (DSL, cable,

etc.) are not located in the vicinity of the project site. At the Contractor's option, provide hotspots and VoIP devices in lieu of landline connections.

1. Separate Telephone Lines, Hotspots and Devices: Provide additional telephone lines or devices for the following:
 - a. Where the Contractor has more than one job office or trailer, install a telephone or hotspot for each additional location. These devices may be on the main Contractor number. On the main Contractor phone location provide an automatic answering machine or voice mail that picks up all calls after a certain number of rings.
 - b. Provide a telephone and dedicated line in a covered location, accessible to all workers. This telephone may be a VoIP device or cellular if wired connections are not available.
 2. At each telephone, post a list of important telephone numbers including emergency numbers.
 3. Cellular telephone: The Project Superintendent(s) shall be provided with a mobile telephone to be operational and on his/ her person at all times during the Work. The number of this device shall be given to the Owner, Architect/ Engineer, and designated WSH staff.
 4. Photocopier: Provide an operational photocopy machine in the Field Office or other convenient on-site location for use by construction personnel and accessible and open to the Owner's and Architect/ Engineer use. Regularly service and maintain the machine and provide on-site extra stock of paper, toner and other expendables for Project use. Must have capacity to feed multiple sheets of 11 by 17 inch paper and be so stocked.
- G. Sanitary facilities: Include temporary toilets and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Use of permanent facilities existing or provided under this contract is not permitted unless explicitly noted.
1. Provide toilet tissue, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
 2. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel where materials being handled or governing regulations and health codes require.
- H. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
1. Provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7 to 13 deg C).
- I. Construction Cleaning and Janitorial Service: The Project shall be left broom clean at the end of each work day. Where the Project involves work in active Owner use areas in an occupied facility or site, including evening, night or weekend shift work, the Contractor shall provide daily janitorial services so that when the occupants return for their next

period of usage the facility is suitably clean as if maintained by the Owner's own staff. All construction debris, tools, materials and equipment shall be removed to a safe and secure location, not occupant accessible. The affected occupant areas shall be cleaned and dusted/vacuumed to include the floor, cabinetry, equipment, furnishings and all work surfaces including tack and marker boards.

- J. Sanitary Sewers: If sanitary sewers are available and it is approved by the authority having jurisdiction, provide temporary connections to remove effluent that can be discharged lawfully. If sanitary sewers cannot be lawfully used for discharge of effluent, provide closed containers to remove and dispose of effluent off-site in a lawful manner. No effluent is to run off-site or be allowed to soak into or stand on grade on-site.
- K. Storm Sewers: If storm sewers are available and it is approved by the authority having jurisdiction, provide temporary connections to remove run off that can be discharged lawfully. If storm sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, erosion control and similar facilities as required by local jurisdiction and as required to prevent all uncontrolled or unacceptable run-off from reaching neighboring properties, drainage ways, streams, rivers, ponds, lakes or other wetlands, Owner occupied portions of the site or public right of ways.
 - 1. Filter out soil, construction debris, chemicals, oils, and all contaminants that might clog sewers, drainage ways or pollute waterways or soils, before discharge.
 - 2. Maintain temporary storm sewers and drainage facilities in a clean, sanitary and fully functioning condition. Following use, restore to clean fully functioning conditions promptly. Assign responsible personnel and monitor facilities during storms and similar events to ensure full function of facilities and protections noted above. This monitoring shall take place around the clock and over weekends and holidays as events warrant. Damage to neighboring properties, waterways, wetlands, public right of ways, the Owner's property or the Work of this Contract due to failure to monitor or maintain shall be solely the responsibility of the Contractor. Damage shall be repaired to original or better condition and all fines/ penalties paid promptly.
 - 3. Provide and maintain any temporary erosion and sedimentation control measures required by the local jurisdiction and the Contract Documents and any additional measures prudent to prevent uncontrolled or unacceptable storm water runoff from leaving the property.
 - 4. Comply with NPDES, SWAPPP, and ecology general permit.
- L. Provide earthen embankments, solid covers and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by rain or runoff of storm water and any additional measures prudent to allow maximally productive pursuit of the Work. Provide flashing marker lights, barricades, solid covers and other devices as necessary to keep workers or passersby from falling in excavations or tripping/ falling over hazards.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.

1. Maintain support facilities until near Substantial Completion. Remove no later than date of Substantial Completion.
- B. Provide incombustible construction for offices, shops, and sheds located within the construction area or within 30 feet (9 m) of building or property lines. Comply with requirements of NFPA 241.
- C. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep the office clean and orderly. If not otherwise noted in the Contract Documents, provide at least one dedicated 8 by 12 foot space for use for progress and other meetings. Furnish and equip as follows:
 1. Furnish with a firm table, chairs, ample light, power, heat, ventilation, four by eight foot marker board and four by eight foot tack surface, securely wall mounted.
- D. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces.
- E. Temporary Access Roads and Paving: Contractor is to provide all accesses and temporary roads on the site as necessary to allow expeditious prosecution of the Work whether or not they are indicated on the Drawings. Construct and maintain temporary roads and paving to adequately support loading anticipated and to withstand exposure to traffic during the construction period without allowing muddy, dusty or unsafe conditions to develop. Locate temporary access roads and paving for roads, storage areas, and parking where similar permanent facilities will be located, within the construction area, if possible. If it is necessary to locate accesses, roads or paved areas outside of the construction area delineated on the Drawings, confirm that such locations are acceptable to the Owner and the authority having jurisdiction.
 1. Paving: Provide ample thicknesses of Asphalt Treated Base (ATB) or other approved material on prepared sub-grades where access must be assured.
 2. Coordinate temporary road development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving and other Work of the Contract where the road(s) and the Work may be in conflict.
 3. Install temporary paving to minimize the need to rework the installations and, where possible, to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
 4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, parking and supervision.
 6. If temporary roads or other areas used by the Contractor, cross or conflict with public pedestrian, vehicular or other traffic, such crossing and conflict points shall be provided with traffic controls, crossing guards, flagmen or other such

controls and safeguards as necessary to allow safe and beneficial traffic conditions for all affected parties. Contractor operations causing unsafe conditions shall be halted immediately and safe alternatives explored and implemented.

- F. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 31 and 32 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, theft, vandalism, other construction operations, and similar activities.
 - 1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 - 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed or steel construction.
- H. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- I. Temporary Elevator Use: Where elevators exist or are to be installed as part of the work, they are not permitted for Contractor's use unless specifically noted otherwise.
- J. Temporary Signs: Prepare signs to provide directional and safety information to construction personnel, site occupants and visitors.
- K. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed or site is occupied.
- L. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- M. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance. Restore any damaged finishes to like new conditions.

1. Where scaffolding over 10 feet in height is in use, furnish scaffolding with integral stairs.
- N. Vertical and Horizontal Access Systems: Where the height or reach distances of the work requires, provide scaffolds, staging, ladders, ramps, runways, platforms, railings, fall/drop prevention, hoists, cranes, chutes and other temporary access or protection systems as necessary to accomplish the Work. Provide and use in accordance with all applicable regulations and manufacturer's instructions. Check regularly and maintain in first-class condition.
1. Where work has the option of being accessed by scaffold or swing staging and the work requires special inspection, use scaffolding. Where the use of swing staging cannot be avoided, train, provide all safety equipment and escort special inspectors, Architect/ Engineer and Owner when they are involved with swing staging use.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as required by the Architect.
- B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in all areas except as areas specifically designated for smoking.
 - a. Smoking is strictly prohibited within the building enclosure.
 4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition. Maintain fire watch personnel on-site during use of such devices and for adequate lengths of time after their use has been terminated to ensure sparks or embers are not smoldering in cavities or other previously undetected location.
- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities. Protect from damage and false alarms.

- D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- E. Security Enclosure Fence: Before starting Work, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the portion determined sufficient to accommodate construction operations after obtaining owner approval. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates. Maintain strict accounting and control of keys and locks. If keys are lost or unaccounted for, the locks shall be immediately changed. All Contractor parking and construction trailers must be located inside the security fence.
 - 1. Where projects are phased or otherwise have multiple stages, steps or where Owner occupancy will change over the course of a project, presume that fencing will have to be reconfigured accordingly as many times as necessary to safely and securely accommodate such phases, stages and changes.
 - 2. At no time shall fencing be allowed to become a safety hazard to anyone or be unsecured/ unmaintained so that it does not afford reasonable security protection.
- F. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft or usable for vandalism, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism. Maintain strict accounting and control of keys and locks. If keys are lost or unaccounted for, the locks shall be immediately changed.
- G. Landscape Protection: Protect existing trees, shrubs and lawns within and adjacent to the area of the Work where not scheduled for demolition or replacement. Where minor limb or root pruning is necessary to avoid interference with construction, employ a certified tree surgeon recognized by the International Society of Arboriculture or the National Arborist Association. Any pruning shall be approved by the Architect and the Owner's grounds maintenance staff prior to executing the Work.
- H. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.
 - 1. Per the City of Lakewood Municipal Code 8.36.010 (B) (8), sounds originating from construction sites, including but not limited to sounds from construction equipment, power tools and hammering are prohibited between the hours of

10:00 p.m. and 7:00 a.m. on weekdays and 10:00 p.m. and 9:00 a.m. on weekends.

3.5 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
 - 1. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.
 - a. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
- C. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures, winds, snow loads, rain, storm water run-off, theft, vandalism, earthquake and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- D. Termination and Removal: Unless the Architect/ Engineer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other chemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, landscaping and sidewalks at the temporary entrances, as required by the governing authority.

3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
 - a. Replace air filters and clean inside of ductwork and housings where permanent HVAC equipment was within the construction area whether or not it was routinely operating during the Work.
 - b. Replace significantly worn parts and parts subject to unusual operating conditions.
 - c. Replace permanent lamps burned out or noticeably dimmed by hours of use.

END OF SECTION 015000

SECTION 015010 – PROJECT IDENTIFICATION SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Furnish, install and maintain temporary on-site project identification sign, informational signs and any other signs required by governing authorities or union contracts to identify project and direct traffic.
- B. Allow no other signs to be displayed including:
 - 1. Separate Contractor's, Subcontractor's, or supplier's signs or advertisements;
 - 2. Signs which flash, blink, rotate or otherwise draw unusual attention, except where required by safety regulations;
 - 3. Company or agency logos; and
 - 4. Any sign or graphic on equipment that is objectionable to Owner.

1.3 SUBMITTALS

- A. Design Data: Submit sign construction details. Where text may not be detailed, show layout of required information. Indicate margins, borders, spacing, and the like.

PART 2 - PRODUCTS

2.1 PROJECT IDENTIFICATION SIGNS

- A. Project Identification Signs: Engage an experienced sign painter to apply graphics. Use painting or vinyl application as appropriate to use and with sufficient field life to be clean, neat and readily legible over the life of the project. Provide replacement sign when original has been damaged or has deteriorated. Comply with details indicated. If not indicated, provide as a minimum:
 - 1. Size: 8'-0" x 4'-0".
 - 2. Number of signs: Four (4).
- B. Graphic design, style of lettering, and colors: As indicated or directed. Colors to include background, two lettering colors and project graphic rendering.
- C. Sign shall identify Project, Owner, Architect, Subconsultants, General Contractor and primary Subcontractors as follows:
 - 1. Sign shall state most prominently the Owner's and project name; project title; Owner's logo; scheduled completion date and budget.

2. Sign shall state secondarily, and as equals, the Design and Contractor teams.
3. Sign shall have a prominent notation in highly visible color such as yellow or red reading: "IN CASE OF EMERGENCY, CALL ###-####". Phone number to be supplied by the Owner.
4. Use black letters on white background with Owner's name and logo and emergency numbers in colors noted above.
5. Submit to the Owner and Architect/Engineer for approval, scaled signage layout drawing in color. Clearly and to scale, indicate size of letters and logo, color scheme and other pertinent data.

2.2 SIGN MATERIALS

- A. Sign Surfaces: Exterior softwood plywood, 3/4 inch thickness, with medium density overlay.
 1. Other sign surfaces may be submitted to the Architect for review and approval.
- B. 2 Treated 4 x 4 10 foot posts per sign.
- C. Rough Hardware: Galvanized.
- D. Paint: Exterior quality. Use "Bulletin" colors for graphics. Colors for structure, framing, sign surfaces, and graphics: As indicated or directed.

2.3 FABRICATION

- A. Paint all exposed surfaces of supports, framing, and surface materials. Apply one coat primer and one coat exterior paint.
- B. Paint or apply graphics in styles, sizes, and colors, as indicated or directed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before application for first payment request, erect sign on the site at location as directed by Owner.
- B. Set sign post 3'+ in ground.

3.2 MAINTENANCE

- A. Maintain signs and supports in neat, clean condition. Repair damages.

3.3 REMOVAL

- A. Remove temporary signs, framing, and supports at completion of project.

SECTION 015700 - EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes but is not limited to the implementation and maintenance of a comprehensive erosion control plan that complies with the City of Lakewood regulations. The contractor is responsible for implementing Best Management Practices (BMP's) in accordance with the City of Lakewood requirements. The information provided on the contract plans should be considered a minimum for the anticipated construction and conditions. The contractor shall be responsible for adding additional BMP's as conditions change at no additional cost to the owner. The Contractor shall coordinate installation and inspections of the BMP's with the City of Lakewood Clearing and grading Inspector. Additional BMP's shall be stockpiled on site as requested by the Clearing and Grading Inspector.
- B. This Section includes the following:
 - 1. Silt Control Measures
 - 2. Temporary Stormwater Runoff Control
 - 3. Measures to keep streets clean
 - 4. P.E. sheeting cover for exposed soil
 - 5. Maintaining, monitoring, and supplementing silt control, storm water runoff control measures and additional BMP's as required by the City of Lakewood and the NPDES permit.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 013323 "Submittal Procedures"
 - 2. Section 312000 "Earthwork"
 - 3. Section 334100 "Storm Drainage"

1.3 REFERENCES

- A. WSDOT Standard Specifications Washington State Department of Transportation
2016 Standard Specifications for Road, Bridge, and Municipal Construction.
- B. City of Lakewood Engineering Standards Manual (current edition)
- C. Geotechnical Reports

1. Subsurface Exploration, Geologic Hazards, and Preliminary Geotechnical Engineering Report for Proposed Western State Hospital Commissary and Kitchen Building, by Associated Earth Sciences, Inc. dated September 27, 2017

D. NPDES: Construction Stormwater General Permit

1.4 SUBMITTALS

- A. General: Submit in accordance with Section 013323 "Submittal Procedures".
- B. Product Submittals: Product catalog cuts for silt fence, and siltsac inserts. Aggregate Materials: Coarse aggregate for gravel construction entrance.
- C. Contractor shall prepare and submit a Surface Water Pollution Prevention Plan (SWPPP) as part of the Clear and Grade Permit.

1.5 REGULATORY REQUIREMENTS

- A. Work to comply with City of Lakewood standards. The Contractor shall coordinate with the City of Lakewood Clearing and Grading Inspector.
- B. Comply with the requirements of the NPDES Construction Stormwater General Permit.

1.6 NPDES CONSTRUCTION STORMWATER GENERAL PERMIT

- A. Western State Hospital (WSH) has applied for, and is in the process of, securing the project's NPDES Construction Stormwater General Permit (herein referred to as the NPDES Permit) from the Department of Ecology. WSH will provide a copy of the NPDES Permit to the Contractor upon receipt.
- B. Western State Hospital is currently listed as the Operator/Permittee for the NPDES Permit. Prior to commencing earth moving activities, WSH will transfer the permit to the Contractor after the contract has been awarded. WSH and the Contractor shall complete the "Transfer of Coverage" application to change the Operator/Permittee and the Contractor shall complete the On-Site Contact Person. The Contractor shall take on all responsibilities associated with the NPDES Permit including taking ownership of the Surface Water Pollution Prevention Plan (SWPPP), monitoring and reporting requirements for stormwater discharge for turbidity and pH, and all other aspects of the NPDES Permit, for the duration of the Contract. This scope of work is considered part of the base contract.
- C. Contractor shall conform to all requirements in the NPDES Construction Stormwater General Permit including, but not limited to, the following:
 1. Prepare and maintain the SWPPP. The Contractor will be responsible for maintaining and updating the SWPPP. A draft copy of the SWPPP has been submitted to the City of Lakewood and is included for reference. The Contractor shall take full ownership of this document as necessary to address the means and

methods, as well as to address site specific conditions that come up as part of the Contractor's inspections.

2. Have a Certified Erosion Control Lead (CECL) on site and available at all times. The Contractor shall provide the appropriate number of certified personnel to execute the work.
3. Provide and install required source control measures, Best Management Practices, storm water treatment measures, and maintain compliance with stormwater discharge requirements as specified in the NPDES Permit and summarized below in Part III of this document.
4. Test any stormwater runoff leaving the construction for turbidity and pH. Record results and submit reports to DOE per the NPDES standards.
5. File a notice of termination application to complete the NPDES permit once the site is stabilized according to DOE standards.

1.7 SEQUENCING AND SCHEDULING

- A. Install erosion control measures in work areas prior to any clearing, grubbing, demolition, general site grading, or other construction in the area. Erosion control items shall be installed and removed at various times throughout the duration of the project.

1.8 MAINTENANCE

- A. Maintain erosion control through the duration of the project.
- B. Maintain erosion control after substantial completion per this section.
- C. Provide continuous monitoring as required by the NPDES permit.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Filter Fabric Fence: In accordance with WSDOT Standard Specifications Section 9-33, Permanent Erosion Control, High Serviceability, Class B.
- B. Straw Mulching: In accordance with WSDOT Standard Specifications Section 9-14.4(1)
- C. Filter Fabric: Mirifi 140N or equal.
- D. Filter Bag Inserts: Commercially manufactured filter bags specifically manufactured for silt filtering and which will provide filtering performance required. Contractor to verify current standards with the City of Lakewood Inspector.
- E. Polyethylene (PE) Sheeting: In accordance with WSDOT Standard Specifications Section 9-14.5(3)
- F. Storm Drain Pipe: Per Section 334100.

PART 3 - EXECUTION

3.1 GENERAL

- A. The implementation of the Erosion Control system and the maintenance, replacement and upgrading of these facilities is the responsibility of the Contractor until all construction is approved. The Temporary Erosion and Sediment Control (TESC) facilities must be maintained in conjunction with all clearing and grading activities, and in such a manner as to insure sediment laden water does not enter the drainage system or violate applicable water standards in accordance with the City of Lakewood requirements and the contract documents.
- B. The TESC facilities shown on the plans are the minimum requirements for anticipated site conditions.
 - 1. During the construction period, the erosion control facilities installed may require maintenance, relocation or upgrading (e.g. additional sumps, relocation of ditches and silt fences, etc.) as shown on the plans or as needed.
 - 2. Contractor shall pay for all costs associated with the construction, maintenance, upgrading and removal of the erosion control system throughout project duration.
- C. Adequate temporary and permanent control of surface water runoff and subsurface seepage will be required in order to allow site access, grading, and construction of underground utilities to proceed.
 - 1. Site preparation and initial construction activities should be planned to minimize disturbance to the existing ground surface particularly during extended wet weather periods when the presence of excess moisture will render the site soils more prone to disturbance.
 - 2. During wet site conditions, equipment traffic should not be allowed on exposed subgrade areas. Erosion of the soil will occur as exposed surfaces are disturbed due to construction activity and exposure to climatic conditions.
 - 3. The Contractor shall be responsible for protecting disturbed or prepared surfaces by some form of weather cover if left exposed for more than 2 days.
 - 4. Contractor shall also protect disturbed or prepared surfaces from surface ponding, storm water runoff, and construction traffic.
 - 5. The Contractor will be solely responsible for any repairs required to these surfaces at no additional cost to the owner.
- D. Access Streets and Roadways: Provide wheel cleaning stations to clean wheels and undercarriage of trucks before leaving site, as necessary to prevent dirt from being carried onto public streets. If streets are fouled, clean immediately in conformance with City of Lakewood and all governing requirements and regulations.

3.2 TURBIDITY MONITORING

- A. The Contractor shall be responsible for meeting turbidity and pH requirements as stated within the NPDES Permit. Additional TESC measures may be required to achieve

discharge requirements. The Contractor shall be responsible for providing additional measures as work progresses to meet turbidity requirements.

- B. The proposed project will implement a turbidity monitoring program in compliance with the State Surface Water Quality Standards (WAC 173.201 A) for all stormwater runoff which leaves the construction site. The Contractor's CECL shall be responsible for coordinating the monitoring plan with the City of Lakewood Construction Inspector. Monitoring will be accomplished by testing on-site construction runoff flows discharging from the site. The CECL shall perform the turbidity measuring using an approved turbidity meter. The person performing the testing and monitoring shall be familiar with the turbidity meter and all applicable laws and regulations associated with the turbidity monitoring program.
- C. Turbidity monitoring and reporting will be required daily during construction in the rainy season (November 1st through April 30th) and weekly between May 1 and October 31 for construction runoff leaving the site. Turbidity reports may not be necessary during extended periods of low flow or no flow conditions; the CECL shall coordinate this arrangement with the City of Lakewood Inspector. Due to the anticipated low flow or no flow conditions during the drier summer months, storm water flow may cease, causing an interruption in the turbidity monitoring and reporting.
- D. The benchmark for turbidity is defined as:
 - 1. 25 NTU (nephelometric turbidity units)
 - 2. The contractor shall refer to the NPDES Permit for remedial measures when storm water discharging from the site has a turbidity measurement higher than 25 NTU's.
- E. The CECL shall post the turbidity monitoring results on the Turbidity Testing Form contained within the NPDES Permit. The form shall be posted in the job trailer and distributed to the Owner, the City of Lakewood Inspector, and the Department of Ecology. The Turbidity testing results shall be posted immediately after the test is performed.
- F. If during the construction season the monitoring reports indicate that the threshold level of turbidity is exceeded for construction runoff discharging from the site, the CECL must report the condition to the Clearing and Grading Inspector immediately, or as soon as practical. The Contractor shall maintain a stockpile of materials to implement additional BMP measures as required during construction to bring the project into compliance when the threshold level of turbidity has been exceeded. A final report must be submitted to the Clearing and Grading Inspector and the DEO once the site is fully stabilized.

3.3 pH MONITORING

- A. The proposed project shall implement a pH monitoring program in compliance with the State Surface Water Quality Standards (WAC 173.201 A). The Contractor's CECL shall be responsible for coordinating the monitoring plan with the City Construction Inspector and the DOE.

- B. The CECL shall be responsible for meeting pH requirements as stated within the NPDES Permit. Additional TESC measures may be required to achieve offsite stormwater discharge requirements. The Contractor shall be responsible for providing additional measures as work progresses to meet pH requirements at no additional cost to the owner.
- C. pH monitoring shall be conducted with a calibrated pH meter, pH test kit, or wide range pH indicator paper.
- D. pH monitoring shall begin when concrete is first poured and exposed to precipitation, and continue weekly throughout and after the soil-cement treatment and concrete pour and curing period, until stormwater pH is in the range of 6.5 to 8.5 Standard Units (su). During this time, a representative sample must be obtained to conduct a pH analysis at least once per week.
- E. pH shall be monitored in the sediment pond or other locations that receive stormwater runoff from the area of significant concrete work before the stormwater discharges to surface waters.
- F. The acceptable range for pH is 6.5 to 8.5(su). Anytime sampling indicates that pH is lower than 6.5 or greater than 8.5, the Contractor must either:
 - 1. Prevent the low or high pH water from entering storm sewer systems or surface waters; or
 - 2. If necessary, adjust or neutralize the high pH water until it is in the pH is within the range of between 6.5 and 8.5 (su) using an appropriate treatment BMP such as carbon dioxide (CO₂) sparging or dry ice. The Contractor must obtain written approval from Ecology before using any form of chemical treatment other than CO₂ sparging or dry ice.
- G. The CECL shall post the monitoring results in the job trailer and distribute to the Owner and the City Inspector and submit online to DOE. The results shall be posted immediately after the test is performed. A final report must be submitted to the City Inspector at the conclusion of pH-altering processes.
- H. If, during the construction season, the monitoring reports indicate that the threshold range of pH is exceeded, the CECL must report the condition to the City Inspector and DOE immediately, or as soon as practical. The Contractor shall maintain a stockpile of materials to implement additional BMP measures as required during construction to bring the project into compliance at no additional cost to the owner.

3.4 EXAMINATION

- A. Verify locations of existing catch basins and related storm drainage features that may be impacted by construction activities.

3.5 PREPARATION

- A. Locate existing utilities, avoid damage or disturbance. For aid in utility location call "Dial Dig 1-800-424-5555," 48 hours (two working days) prior to beginning construction. Provide and pay for additional marking as required.
- B. Survey limits of work to install silt fence.
- C. Perform clearing or other work required to installing erosion control.

3.6 CONSTRUCTION

- A. Filter Fabric Fence: Field-adjust location to perimeter of clearing and stripping. Location shown on drawings is schematic. Cast all trench excavation soils from fence installation to the Construction side of fence. Overlap filter fabric fence joints minimum 1 foot prior to backfilling trench.
- B. Polyethylene Sheeting: Overlap joints minimum 28 inches. Overlap in direction of drainage and prevent water from draining onto material being protected. Secure in place to prevent movement and damage. Provide sandbags at 2.5 feet spacing and tie the sand bags together with rope on slopes greater than 3:1. Minimize driving stakes through plastic.
- C. Diversion Swales and Berms: Construct in a manner to intercept, divert, and channel runoff to sediment ponds. Plan locations are schematic. Field adjust, move, and reconstruct as necessary during construction to maintain drainage to sediment ponds and allow construction to proceed. Provide Straw bale check dams at minimum 100 feet spacing.
- D. Straw Bale Check Dams: Construct such that drainage flows through bales. Bevel bale edges or fill gaps to insure drainage passes through straw filter. Larger flows may flow over top on occasion. Key bales into ground to prevent drainage under bales. Raise elevations of ends of check dams to prevent drainage around ends. Provide splash pad on downstream side to prevent scouring from high flows or overtopping.
- E. Mulch: Mulch exposed soils not protected by other means. Provide continuous covering minimum depth of 3 inches. Apply mulch with tackifier to prevent blowing.

3.7 ADJUSTMENTS AND REVISIONS

- A. Adjust or move swales, berms, pipes, culverts, bales, and silt fences as necessary during construction to direct site runoff to temporary ponds, silt filters, and grass swales.

3.8 PROTECTION AND MAINTENANCE

- A. Protection:
 - 1. Infiltration Systems:
 - a. The Stormwater Plan includes the installation of permanent infiltration facilities. The Contractor is responsible for protecting these facilities during construction.

- b. Excavate to a minimum of 3 feet above the design bottom elevation of the infiltration systems until the site is stabilized and only non-sediment laden water will enter the infiltration system. Contaminated infiltration system subgrades shall be repaired at the Contractor's expense.
 - c. Avoid compacting the subgrade of the permanent infiltration facilities.
 2. Where possible, maintain natural vegetation for silt control.
 3. Prevent silt-laden water from leaving site or from entering off-site storm sewer systems.
 4. All slopes, cut, or fill areas where Work has stopped for more than 30 days shall be stabilized by mulching, polyethylene sheeting or other method to prevent erosion and sediment transport.
 5. Keep all off-site parking areas and streets clean from construction activities. Paved surfaces shall be kept clean by the use of mechanical sweeping equipment, hand shovels and brooms or other accepted methods suitable of removing dirt, rock, silt and sand. No street washing will be allowed.
- B. Supplementary measures:
 1. Provide additional silt control and temporary erosion control measures as required to protect soils and prevent silt laden runoff from leaving project site at no additional cost to the owner.
- C. Maintenance:
 1. Monitor and maintain silt control measures. Remove accumulations of sediment when more than 50 percent of silt storage capacity is filled. Maintain all temporary erosion control facilities until need for each facility has been superseded by other stabilization methods or until Architect authorizes removal.
 2. Inspect and repair temporary erosion control facilities. Inspect entire system to ensure proper operation a minimum of once per week, during and after storms, and prior to weekends and holidays.
- D. Final Stabilization
 1. Final Stabilization shall be per the Construction Plans. All construction debris shall be removed. All temporary erosion control features shall be removed from the site and disposed of in a legal manner, and associated land disturbance shall be repaired to match existing conditions or conform to proposed conditions as required.

END OF SECTION 015700

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.3 ALTERNATIVE PRODUCTS AND SUBSTITUTION REQUESTS

- A. The contractor shall investigate proposed substitutions with respect to the following:
 - 1. Environmental concerns: Substitutions may impact LEED credit achievement. Contractor shall identify which LEED credit strategies may be affected by any proposed substitutions.
 - 2. All Substitution Requests shall be accompanied with documentation that indicates the pertinent environmental performance criteria of the substitute material are equal or superior to the specified material.

1.4 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 2. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
 - 3. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
- B. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

- C. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.5 SUBMITTALS

- A. Product List: Prepare a list showing products specified in tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.
 - 1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.
 - 2. Form: Prepare product list with information on each item tabulated under the following column headings:
 - a. Related Specification Section number.
 - b. Generic name used in Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - 3. Submittal Timing: Within ten (10) days after Award of Contract, submit two (2) copies or one (1) electronic copy of the product list to the Architect. Provide a written explanation for omissions of data and for known long lead items.

1.6 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
 - 1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner submit written documentation and point of contact from the manufacturer as to why the specification or schedule cannot be met. Consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model, serial number and date of manufacture.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- B. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- C. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Store in the same position in which they will be installed.
- D. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- E. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
- F. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- G. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.
 2. Semiproprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.
 - a. Where Specifications specify products or manufacturers by name, accompanied by the term "or approved" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
 5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
 6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply

with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.

7. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 016000

SECTION 017123 - FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field-engineering services including, but not limited to, the following:
 - 1. Land survey work.
 - 2. Special survey work for easements, utilities and other requirements of authorities having jurisdiction.

1.3 SUBMITTALS

- A. Survey firms' name, address, telephone and fax number.
- B. Key personnel assigned to the Work.
- C. Record of Work: Upon request, submit record information and references attesting to the accuracy of previous work for this or other clients.
- D. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements and stating if said improvements are conforming or non-conforming with the requirements of the Contract Documents. Deliver one original signed certificate to Owner and a copy to the Architect/ Engineer prior to Substantial Completion.
- E. Final Property Survey: Submit six copies, one mylar reproducible and one DWG file format computer disk of the final property survey to the Architect/Engineer prior to Final Completion.
- F. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Project Record Documents" and "Project Closeout" Sections. Such Record Documents to include, but are not limited to, the following:
 - 1. Complete, accurate, neatly organized and legible log of control and survey work in a chronological or project progress order.
 - 2. Certified and stamped survey prepared following installation of foundations and other major site improvements.

1.4 QUALITY ASSURANCE

- A. Surveyor Qualifications: Engage a land surveyor registered in the State of Washington, acceptable to the Architect/Engineer and Owner, to perform required land-surveying

services. All survey work is to be in conformance to recognized engineering survey practices.

1. Provide copy of Surveyor's State Registration.
2. Submit affidavit or insurance certificate affirming that Surveyor's Errors and Omissions Insurance is in force and will remain so for the duration of the project.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Identification: The documents will identify existing control points and property line corner stakes where known. Where not so identified in the documents, Surveyor to locate and identify.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
 2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.
- C. Establish and maintain the number of permanent benchmarks on the site as required by the Work, but not less than 2, referenced to data established by survey control points.
 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- D. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.
 1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.

3.2 PERFORMANCE

- A. Work from lines and levels established by the property survey. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

1. Advise entities engaged in construction activities of marked lines and levels provided for their use.
 2. As construction proceeds, check every major element for line, level, and plumb.
- B. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log legible and available for reference.
1. Record deviations from required lines and levels, and advise the Architect/Engineer when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 2. On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations and all other pertinent survey data of construction and site work.
- C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
- E. Existing Utilities: Furnish information necessary to adjust, move, protect or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- F. Final Property Survey: Prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey.
1. Recording: Prior to Final Completion, have the final property survey recorded by or with local governing authorities as the official "property survey."

END OF SECTION 017123

SECTION 017329 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.
 - 1. Requirements of this section apply to all work, including, but not limited to, mechanical and electrical installations. Refer to Division 23 and Division 26 sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DESCRIPTION OF REQUIREMENTS

- A. Definition: “Cutting and patching” includes cutting into installed construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.
 - 1. Cutting and patching is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
 - 2. Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be “cutting and patching” under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be “cutting and patching.”

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal.
 - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building’s appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform work.

4. Indicate dates when cutting and patching is to be performed.
5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the work found to be unsatisfactory.

1.5 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

1. Where cutting and patching involves addition of reinforcement to structural elements, submit a detailed request to the Architect at least seven (7) days prior to initiating work to allow for review of the request by the structural engineering consultant. Include in the request details and engineering calculations to show how reinforcement is integrated with the original structure.
2. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Shoring, bracing, and sheeting.
 - b. Primary operational systems and equipment.
 - c. Air or smoke barriers.
 - d. Water, moisture, or vapor barriers.
 - e. Membranes and flashings.
 - f. Fire protection systems.
 - g. Noise and vibration control elements and systems.
 - h. Control systems.
 - i. Communication systems.
 - j. Electrical wiring systems.

B. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

1. If possible retain the original installer of fabricator to cut and patch the following categories of exposed work, or it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:
 - a. Preformed metal panels.
 - b. Window wall system.
 - c. Veneer plaster.
 - d. Acoustical ceilings.
 - e. Carpeting.
 - f. Wall covering.
 - g. HVAC enclosures, cabinets or covers.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Before cutting existing surfaces, examine surface to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
 - 1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
 4. Comply with requirements of applicable specification sections where cutting and patching requires excavating and backfilling.
 5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, after the patched area has received prior and second coat, extend final paint coat over the entire unbroken surface containing the patch from floor to ceiling and to the nearest corner in both horizontal directions.
 4. Patch, repair or rehang ceilings as necessary to provide an even plane surface of uniform appearance.
- D. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats as indicated.
1. Unless otherwise indicated provide 3-coat work.
 2. Finish gypsum plaster with smooth-trawled finish. Sand lightly to remove trowel marks and airses.
 3. Cut, patch, point-up and repair plaster to accommodate other construction and to restore cracks, dents and imperfections.

3.4 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION

- A. Section Includes: Development and implementation of a Construction Waste Management (CWM) Plan during construction to salvage and/or divert construction, demolition and land clearing debris from this project from landfill disposal and incineration, as tracked through Construction Waste Management Reports

1. The Owner desires that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
2. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled.

- B. With these goals the Contractor shall develop, for the Architect's and Owner's review, a Waste Management Plan for this project. Attachments are included which may be used in the development of this plan.

- C. Related Sections: The following sections contain requirements related to this section:

1. Division 01 Section "Sustainable Requirements."
2. Division 01 Section "Indoor Air Quality Requirements."
3. Divisions 03 – 26 Sections: Individual sections that involve finish materials that are located inside the vapor retarder as well as auxiliary finishing materials installed within the vapor retarder. This includes, but is not limited to, adhesives, sealants, paints, primers, carpets and composite wood products

1.3 REFERENCES

- A. LEED Reference Guide, MR Credit 2 - Construction Waste Management section.

1.4 REQUIREMENTS

- A. Develop and implement a Construction Waste Management Plan which includes the following Best Management Practices:

1. Reuse, salvage, or recycle waste materials to divert a minimum of 75% of total construction waste from landfill and incineration, and redirect recyclable material back to manufacturing process.

2. LEED Coordination Manager: Designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Construction Waste Management Plan for the Project.
 - a. Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project. Conduct meetings, post signage, draft subcontractor agreements to communicate the goals of the waste reduction plan.
 - b. Maintain current waste management records and perform calculations for the Project.
3. List of Recyclable/Salvageable Materials: Identify and include a list of potential materials for recycling and salvage, approximate volumes, waste hauler, and end product for the materials.
 - a. Primary Recycling Target Materials: The following categories shall be diverted from landfill to a recycling facility:
 - 1) Land-clearing debris, excluding soil.
 - 2) Clean dimensional wood, pallet wood, plywood, OSB, and particleboard.
 - 3) Asphalt, concrete, brick and masonry.
 - 4) Ferrous and non-ferrous metals.
 - 5) Gypsum products.
 - 6) Acoustical ceiling tile.
 - 7) Cardboard, paper (including blueprints), paper-based packaging.
 - b. Secondary Recycling Target Materials: The following categories shall be considered for diversion from landfill to a recycling facility:
 - 1) Paint.
 - 2) Glass (bottles and plate) porcelain.
 - 3) Plastics, plastic film, fiberglass (solid).
 - 4) Carpet and pad: 100% Reclamation.
 - 5) Non-asbestos roofing.
 - 6) Mechanical and electrical equipment.
 - 7) Batteries.
 - 8) Doors, windows frames, relites, hardware, millwork.
4. Materials Handling Procedures: Protect materials to be recycled from contamination. Handle, store, and transport materials in a manner that meets the requirements of the designated facilities for acceptance.
 - a. Remove and relocate reusable materials to be reinstalled or retained in a manner to prevent damage or contamination.
 - b. Conduct construction and demolition in such a manner to minimize damage to trees, plants and natural landscape environment.

5. Recycling and waste bin areas: Provide the necessary containers and bins, to facilitate the waste management program. Arrange for adequate collection, and transportation to deliver the recovered materials to the approved recycling center or processing facility.
 - a. Separate construction waste at the project site by one of the following methods:
 - 1) Source Separated Method: Waste products and materials, that are recyclable, are separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Trash is transported to a landfill.
 - 2) Commingled Method: Selected waste materials are placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed and the remaining trash and waste materials are handled separately.
 - 3) Hazardous Wastes: Separate, store, and dispose of hazardous waste according to local regulations.
 - 4) Other methods proposed by the Contractor and approved by the Architect and the Owner.
 - b. Keep recycling and waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
 - c. As part of regular clean-up schedule visual inspections of dumpsters and recycling bins to identify potential contamination of materials.
6. Meetings: Identify and list the schedule, content, and participants in regular and pre-construction CWM meetings as defined in Meetings of this Section.

1.5 SUBMITTALS

- A. Construction Waste Management Plan: Within fifteen (15) working days after receipt of the Notice to Proceed, or prior to waste removal, whichever occurs sooner, the Contractor shall prepare and submit a Draft Construction Waste Management Plan to the Owner's LEED Representative for approval.
 1. The Draft Construction Waste Management Plan shall include the Best Management Practices described in Part 3 of this Section.
 2. In the Plan designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Construction Waste Management Plan for the Project.
 3. Once the Owner's LEED Representative has determined which of the BMPs contained in the draft Plan are acceptable, the Contractor shall submit, within 5 working days, a Final Construction Waste Management Plan.
 - a. The Contractor shall distribute copies of the Construction Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect before work commences on the site.

- b. Confirm to the Owner's LEED Representative in writing that each Subcontractor has received a copy of the approved Construction Waste Management Plan.
 - c. Approval by the Owner's LEED Representative and the Owner of the Contractor's Construction Waste Management Plan will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures specified.
- B. Construction Waste Management Reports: The Contractor shall submit with each Progress Report a Construction Waste Management Report. The Construction Waste Management Report shall be submitted on a form acceptable to the Owner and shall contain the following information:
 1. Use the LEED calculation methodology as defined in the LEED Reference Guide to determine the overall waste diversion rate for the Project.
 2. Measurement of diversion rate is based upon either weight or volume, but must be consistent throughout.
 - a. If commingled recycling services are used, the recycling service must be required to provide hauling receipts outlining what percentage of weight was diverted from landfill and where each materials was diverted to.
 - b. Material sent to a landfill for use as ADC may only be included as "recycled" material in the construction waste management calculations if the landfill provides a letter stating the material was received from the project and was specifically used for ADC, including date of use.
 3. If some of the materials will be donated or sold on-site auctions, describe the process and identify the organizations that may receive the materials.
- C. Follow the specified method for monitoring and documenting the program, and submit a periodic report with each application for payment, including the following.
 1. The amount (in tons or cubic yard of material) of material landfilled from the Project, the location of the Receiving Facility, how the waste will be reused or recycled, the total amount of tip fees paid at the landfill, and the total disposal cost including transportation costs, container rental costs, taxes, etc. Include manifests, weight tickets, receipt, and invoices.
 2. The amount (in tons or cubic yard of material) and type of waste materials salvaged for sale, salvaged for reuse, and recycled. Provide the date removed from the jobsite, the location of the Receiving Facility, the amount of any money paid or received for the recycled or salvaged material, and the total disposal cost including transportation costs, container rental costs, taxes, etc. Include manifests, weight tickets receipts, and invoices. Obtain average recycling rates for each co-mingled material from each receiving facility where co-mingled waste materials are delivered.
 3. Cost savings by waste material due to salvaging, reusing, and recycling materials. Calculate the savings based upon the cost per ton for disposal at landfill compared to the cost per ton for salvaging, reusing, and recycling materials.

4. Totals for date including: trash generated by weight and percentage of total; waste materials generated by weight and percentage of total identified by salvaged for resale, salvaged for reuse, or recycled; cost savings; and percentage of disposal fees saved.
5. For any waste material used as Alternate Daily Cover provide a letter stating the material was received from the project and was specifically used for ADC, including date of use.

D. Application for Progress Payments:

1. The Contractor shall submit with each Application for Progress Payment a Waste Management Report for the Project. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment. The Contractor is ultimately responsible for implementation of the Waste Management Plan and achieving the diversion goals.
2. For each material recycled, reused, or salvaged from the Project, the amount (in tons or cubic yards), the date removed from the jobsite, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling the material. Attached manifests, weight tickets receipts or invoices.

E. Final Construction Waste Management Report: Include a summary of information required by Construction Waste Management Reports for the Project with the Final Report. Submit with Final Application for Payment.

1.6 MEETINGS

A. Pre-construction meeting:

1. Prior to beginning work at the site, or as each subcontractor commences work, schedule and conduct a meeting to review the Construction Waste Management Plan and related procedures, schedules, coordination and specific requirements for waste materials recycling and disposal.
2. Subcontractors shall be required to participate in pre-construction meetings.

B. Regular Meetings:

1. At a minimum, waste management goals and issues shall be discussed at regularly scheduled job-site meetings.
2. Subcontractors who will be on site prior to the next scheduled regular project meeting shall be required to participate.

1.7 REVENUES

A. Revenues or other savings obtained from recycling, reused or salvaged materials shall accrue to the Contractor.

PART 2 - PRODUCTS

2.1 WASTE CONTAINERS

- A. Durable, covered, secured, reusable container for each category or waste.
- B. Signs for each container: Exterior grade panel, painted, message in large letters identifying waste category and waste hauling/disbursement subcontractor.

PART 3 - EXECUTION

3.1 GENERAL

- A. Minimize the creation of construction and demolition waste on the job site. When designing the Construction Waste Management Plan, the Contractor may use more than one of these practices (simultaneously or phased in) as work progresses. In general, the steps include:
 - 1. Prevent waste in the first place:
 - a. Order materials precut to required size.
 - b. Order exact quantity required.
 - c. Use detailed take-offs to identify location and uses in structure to reduce risk of unplanned and potentially wasteful cuts.
 - d. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders or proceeding with work.
 - e. Protect products from damage during storage, installation and in-place.
 - f. Materials that become wet, damp or unusable for any reason due to improper storage shall be replaced at the Contractor's expense.
 - g. Request products delivered to the Site with packing materials that can be returned to sender, reused by others, or easily recycled.
 - h. Coordinate the schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
 - 2. Reuse materials that would otherwise become waste:
 - a. Use temporary materials and facilities that will be reused at other projects.
 - b. Reuse on-site waste for patching existing work.
 - c. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

END OF SECTION 017419

SECTION 017700 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION

- A. Description of General Requirements
 - 1. Closeout is hereby defined as that phase of the Work occurring between the Date of Substantial Completion, as established by a fully executed Certificate of Substantial Completion, and the date of Final Completion, established upon the Contractor's completion of all the items of Work enumerated in Article 6.09 of the General Conditions.

1.3 FINAL CLEANING

- A. See additional requirements in Division 01 Section "Final Cleaning."
- B. Cleaning Materials: Only Green Seal (GS 37 Certified) cleaning materials shall be used in the final cleanup.
- C. Recycle, salvage, and return construction and demolition waste from Project in accordance with requirements with Division 01 Section "Construction Waste Management."

1.4 SUBSTANTIAL COMPLETION

- A. When the Contractor considers his work to be substantially complete, he shall complete the Substantial Completion Checklist, copy bound herein, and submit to Architect for review and recommendation.
- B. Within a reasonable time after receipt of such notice, Architect will inspect project to determine completion status.
- C. Should Architect determine that the Work is not substantially complete:
 - 1. Architect will promptly return the Substantial Completion Checklist to Contractor, noting the reasons why the Work is not substantially complete.
 - 2. Contractor shall remedy deficiencies in the Work and complete incomplete work noted by the Architect, and send a second Substantial Completion Checklist to the Architect, with all required attachments, upon completion/correction of the Work.
 - 3. Architect will observe the Work again.
- D. Should Architect determine that Work is substantially complete, he will:

1. Prepare a Certificate of Substantial Completion, copy bound herein, accompanied by list of items to be completed and/or corrected; and recommendation, together with all required Closeout documentation.
2. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them by Certificate and the value of all outstanding Work.

1.5 FINAL COMPLETION

- A. When Contractor considers his Work 100% complete he shall complete the attached Final Completion Checklist, copy bound herein, and submit to Architect for review and recommendation, together with all required Closeout documentation.
- B. Deficiency List
 1. Final payment of funds reserved for Project closeout, and other withheld funds, will not be granted until all punch list items, and all administrative and procedural requirements, are complete. Each punch list item, when completed by the Contractor, must be initialed by the project superintendent prior to resubmission to the Architect.
- C. With reasonable promptness after receipt of certification, Architect will observe to verify completion status. Should Architect consider Work to be incomplete, non-conforming or defective:
 1. Architect will promptly notify Contractor in writing, listing incomplete, non-conforming or defective Work, including outstanding administrative actions.
 2. Contractor shall take immediate steps to remedy stated deficiencies, and send second written certification to him that the Work is complete.
 3. Architect will observe the Work again. If he considers the work to still be incomplete or defective, Architect shall be compensated for additional services.
- D. Asbestos Free Certification
 1. The Contractor shall certify that all new materials and products for this Contract are free of asbestos. Each supplier and sub-contractor shall warrant to the Contractor that materials and products provided by them as part of the work are free of asbestos. If specified materials or products are known to contain asbestos, the Architect shall be informed, and appropriate action shall be taken to provide asbestos free materials or products. Where any doubt exists, it shall be the responsibility of the supplier or sub-contractor providing the materials and products to verify test results showing that materials and products are free of asbestos.
 2. Submit notarized statement on Contractor's letterhead addressed to the Owner certifying that "to the best of our knowledge" all materials and products provided for this Contract are free of asbestos. Asbestos free certification required prior to Substantial Completion and occupancy of the facilities.

- E. LEED Submittals listed in Division 01 Section "Submittal Procedures" shall be provided prior to substantial completion.
- F. Final Adjustment of Accounts
 - 1. Submit a final statement of accounting to Architect.
 - 2. Reflect all adjustments to Contract Sum for review, and revision if necessary, by Architect and Owner. Indicate the following:
 - a. The original Contract Sum.
 - b. Additions and deductions resulting from:
 - 1) Previous Change Orders.
 - 2) Alternatives.
 - 3) Unit Prices.
 - 4) Unused Allowances
 - 5) Deductions for uncorrected Work.
 - 6) Deductions for Liquidated Damages.
 - 7) Other adjustments.

1.6 FINAL PAYMENT AND RELEASE OF RETAINAGE

- A. Final payment shall be in accordance with the conditions of the Contract upon final acceptance by the Owner and receipt of properly prepared invoice voucher from the Contractor.
- B. Release of retainage cannot occur until after a forty-five (45) day lien period has elapsed following the Final Acceptance of the Work and approval to release retainage from Labor and Industries, Department of Revenue, and Employment Security is received.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017700



DIVISION OF ENGINEERING AND ARCHITECTURAL SERVICES
SUBSTANTIAL COMPLETION CHECKLIST

Project Title: WSH New Kitchen Commissary Pharmacy		Project Number: 2016-41G (2-1)	
Agency: DSHS		Contractor:	
Facility: Western State Hospital		Client Agency Rep:	
Architect/Engineer: NAC Architecture		E&AS Project Manager:	

✓	ACTION:	VERIFIED																			
		BY	DATE																		
	1. Close-Out requirements identified at Construction Close Out Meeting																				
	2. All FAs, COPs, and Change Orders submitted																				
	3. All systems functioning as designed																				
	4. Building Commissioning substantially complete (installation verification, system start up, functional testing, etc.)																				
	5. All utilities and meters connected, tested and operational																				
	6. Contractor's LEED submittals and reports completed and uploaded to USGB																				
	7. Contractor submits notice of completion with remaining incidental corrective work (punch list)																				
	8. A/E* schedules an inspection with the Owner, E&AS PM, and Contractor to inspect work and remaining punch list items. The A/E adds to contractor's punch list, creates a single supplemental punch list, and provides to the contractor within 2 business days.																				
	9. Contractor establishes punch list completion schedule																				
	10. If Prior Occupancy is established, per General Conditions Part 6.08, the areas of prior occupancy are: _____ Prior Occupancy Date(s): _____																				
	11. A/E* confirms receipt of approved: <table style="width:100%; border:none;"> <tr> <td style="width:50%;">a. Occupancy Permit <input style="width:50px;" type="text" value="N/A"/></td> <td style="width:50%;">j. Elevator Permit <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>b. Fire Marshal <input style="width:50px;" type="text" value="N/A"/></td> <td>k. Boiler Permit <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>c. Electrical Inspection <input style="width:50px;" type="text" value="N/A"/></td> <td>l. Dept of Health Permit <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>d. O&M Manuals <input style="width:50px;" type="text" value="N/A"/></td> <td>m. Dept of Ecology Permit <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>e. Draft "As-Built" Drawings <input style="width:50px;" type="text" value="N/A"/></td> <td>n. Staff Training <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>f. Shop Drawings <input style="width:50px;" type="text" value="N/A"/></td> <td>o. Keys and Key Schedule <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>g. Test Reports <input style="width:50px;" type="text" value="N/A"/></td> <td>p. Warranty Responsibility Contacts <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>h. Spare Parts and Materials <input style="width:50px;" type="text" value="N/A"/></td> <td>q. _____ <input style="width:50px;" type="text" value="N/A"/></td> </tr> <tr> <td>i. Certificates of Warranty <input style="width:50px;" type="text" value="N/A"/></td> <td>r. _____ <input style="width:50px;" type="text" value="N/A"/></td> </tr> </table>	a. Occupancy Permit <input style="width:50px;" type="text" value="N/A"/>	j. Elevator Permit <input style="width:50px;" type="text" value="N/A"/>	b. Fire Marshal <input style="width:50px;" type="text" value="N/A"/>	k. Boiler Permit <input style="width:50px;" type="text" value="N/A"/>	c. Electrical Inspection <input style="width:50px;" type="text" value="N/A"/>	l. Dept of Health Permit <input style="width:50px;" type="text" value="N/A"/>	d. O&M Manuals <input style="width:50px;" type="text" value="N/A"/>	m. Dept of Ecology Permit <input style="width:50px;" type="text" value="N/A"/>	e. Draft "As-Built" Drawings <input style="width:50px;" type="text" value="N/A"/>	n. Staff Training <input style="width:50px;" type="text" value="N/A"/>	f. Shop Drawings <input style="width:50px;" type="text" value="N/A"/>	o. Keys and Key Schedule <input style="width:50px;" type="text" value="N/A"/>	g. Test Reports <input style="width:50px;" type="text" value="N/A"/>	p. Warranty Responsibility Contacts <input style="width:50px;" type="text" value="N/A"/>	h. Spare Parts and Materials <input style="width:50px;" type="text" value="N/A"/>	q. _____ <input style="width:50px;" type="text" value="N/A"/>	i. Certificates of Warranty <input style="width:50px;" type="text" value="N/A"/>	r. _____ <input style="width:50px;" type="text" value="N/A"/>		
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	12. Notice from the A/E that the work is substantially complete																				
	13. The E&AS PM and Owner determine the Substantial Completion date																				
	14. Certificate of Substantial Completion issued and Warranty Period begins																				

Notes: _____

* If no there is no A/E for the project, the E&AS PM will complete



Washington State Department of
Enterprise Services
DIVISION OF ENGINEERING & ARCHITECTURAL SERVICES

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT TITLE: WSH New Kitchen Commissary Pharmacy

STATE PROJECT NUMBER: 2016-41G (2-1)

CONTRACTOR:

A/E CONSULTANT: NAC Architecture

OWNER/AGENCY: DSHS

DATE OF ISSUANCE:

DEFINITION OF SUBSTANTIAL COMPLETION

Part 6, paragraph 6.07, of the General Conditions of the Contract. "Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can fully occupy the Work (or the designated portion thereof) for the use for which it is intended."

DESIGNATED PORTIONS OF THE PROJECT SHALL INCLUDE:

Work performed under this contract has been reviewed and to the best of our knowledge found to be substantially complete.

The Date of Substantial Completion for the work described above is hereby established as: _____

The Contractor will complete or correct the work on the list of items attached hereto within _____ calendar days.

RECOMMENDED BY:

A/E CONSULTANT

BY

Signature

DATE

RECOMMENDED BY:

OWNER/AGENCY

BY

Signature

DATE

APPROVED BY:

E&AS PROJECT MANAGER

BY

Signature

DATE

ACKNOWLEDGED BY:

CONTRACTOR

BY

Signature

DATE

Items to be corrected:



FINAL ACCEPTANCE CHECKLIST

Project Number: 2016-410G (2-1)		Project Title: WSH New Kitchen Commissary Pharmacy		
Contractor:		Project Manager:		
✓	ACTION:	Reference Info. ¹	Verified	
			By	Date
1.	Contractor: Submit written notice that all incidental corrective work (punch list) completed	GC 6.09; per Spec.		
2.	Contractor: All work done per contract Print Name: _____ Signature: _____ Date: _____			
3.	A/E²: In consultation with E&AS PM and Owner, conduct a final on-site inspection of punch list to confirm completion.	GC 6.09; per Spec.		
4.	A/E²: Confirms review and approval of final "As-Built" Record Documents from contractor	GC 4.02		
5.	PM: Identify any and all claims and/or disputes	GC 6.09		
6.	PM: Verify all FAs and COPs resolved, approved and all Change Orders processed	GC 6.09		
7.	Commissioning Authority Verification: All post-commissioning fine-tuning complete and issues resolved	GC 6.09; per Spec.		
8.	Commissioning Authority: Submit Commissioning Final Report (except seasonal testing)	GC 6.09; per Spec.		
9.	A/E² Recommendation of Acceptance (All work acceptable per Contract) Print Name: _____ Signature: _____ Date: _____			
10.	Client Agency Acceptance Print Name: _____ Signature: _____ Date: _____			
11.	E&AS PM Determination of Date of Final Completion Print Name: _____ Signature: _____ Final Completion Date: _____			
12.	PM: Verify statement of Apprenticeship Participation reporting complete. If goals weren't met, PM creates a memo for the project folder explaining why	Sup Conds 10.12; per Spec.		
13.	PM: Verify any and all claims and/or disputes resolved	GC 6.09		
14.	PM: Verify final contractor invoicing (100% & retainage as applicable) complete	GC 6.09; per Spec.		
15.	Contractor: Submit final list of subcontractors, all tiers, that worked on the project	GC 5.04C		
16.	PM: Verify all affidavits, including lower tier subcontractors, submitted to L&I	GC 5.04 RCW 39.12.040		
17.	PM: Verify that final audit is complete and notify the Contracts Specialist to close the project in the DES Diversity Compliance program (B2Gnow)			
18.	E&AS APM Approves Closing the Contract Print Name: _____ Signature: _____ Date: _____			
19.	CS: Closes the contract and advertises the Final Acceptance date. 45-day lien period begins.			
20.	CS: Notifies the A/E, Client Agency, and Contractor that the contract has been accepted.			
21.	PM: Identify requested contract action	Close Agreements (A/E)	<input type="checkbox"/>	
		Close Project	<input type="checkbox"/>	

Footnotes:

¹ References are for information. Contractor shall refer to the Contract Documents to fulfill all contract requirements.

² If there is no A/E for the project, the E&AS PM will complete

SECTION 017710 - FINAL CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for final cleaning at Substantial Completion.
 - 1. Special cleaning requirements for specific elements of the Work are included in appropriate Sections of Divisions 03 through 33.
- B. General Project closeout requirements are included in Section "Closeout Procedures."
- C. Environmental Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
 - 1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
 - 2. Burning or burying of debris, rubbish or other waste material on the premises is not permitted.
 - 3. Only use products that are environmentally safe and that will not cause or contribute to Indoor Air Quality (IAQ) problems when the facility is occupied.
- D. Cleaners shall be recognized industry professionals with at least 10 years experience in the post-construction cleaning of large commercial and institutional facilities. Cleaners shall have sufficient labor available to clean the entire project in a very tight time period and shall work evening, weekend and holidays as required to accomplish complete cleaning of the Project prior to Owner occupancy or during Owner's period of taking occupancy.
- E. Should the Contractor fail in any of its duties described in this Section, the Owner may, at its sole discretion, have the Project cleaned thoroughly to its standards by a professional service. The Cost of this cleaning shall be deducted from the Contractor's Final Payment.

1.3 REFERENCES

- A. Green Seal website <http://www.greenseal.org/findaproduct/index.cfm> for a list of approved products.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Materials: Only Green Seal (GS 37 Certified) cleaning materials shall be used in the final cleanup.
 - 1. Do not use cleaning agents that might damage finished surfaces. Pay special attention to easily marred surfaces and reactive metals such as aluminum.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning operations for all trades. Employ professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a first class institutional building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion for the entire Project or a portion of the Project.
 - 1. Clean the Project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petrochemical spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.
 - 2. Remove tools, construction equipment, machinery and surplus material from the site.
 - 3. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Pay special attention to corners and other hard to clean areas. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - 4. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 - 5. Broom clean and shop vacuum concrete floors in unoccupied spaces.
 - 6. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo if any visible wear, soil or odor is present.
 - 7. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds, advertising labels and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - 8. Remove all visible labels that are not permanent labels and are not related to a products fire, mechanical or electrical rating.
 - 9. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or

- that show evidence of repair or restoration. Remove paint from "UL" and similar labels, including mechanical and electrical name plates.
10. Wipe surfaces of mechanical and electrical equipment, elevator equipment and similar equipment. Remove excess lubrication, paint, sealant and mortar droppings and all other foreign substances.
 11. Clean plumbing fixtures to a sanitary condition, free of stains and film, including stains resulting from water exposure and from sealants.
 12. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills. Clean ducts, blowers, and coils if units were operated without filters during construction.
 13. Clean food service equipment to a sanitary condition, ready and acceptable for its intended use and obtain approvals by the Health Department.
 14. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned out or noticeably dimmed bulbs, and slow to start, defective and noisy starters.
 15. Use metal detector to locate all metal objects, nails, etc. that may pose a hazard. Sweep all non-hard surface areas that were within or adjacent to any construction area or over which any construction related traffic traveled.
 16. Leave the Project clean and ready for occupancy.
- C. Pest Control: If pests have been observed, engage an experienced licensed exterminator to make a final inspection, and rid the Project of rodents, insects, and other pests. Comply with regulations of local authorities.
- D. Removal of Protection: Unless requested otherwise by the Owner, remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner.
1. Where extra materials of value remain after completion of associated construction such materials shall become the Owner's property. At the Owner's direction, relocate these materials on site.

END OF SECTION 017710

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Submit separate manuals for the following:
 - 1. Architectural and Miscellaneous Items.
 - 2. Kitchen Equipment.
 - 3. Pharmacy Equipment.
 - 4. Central Services Equipment.
 - 5. Commissary (warehouse) Equipment.
 - 6. Mechanical.
 - 7. Electrical.
 - 8. Civil and Landscape.
 - 9. Warranties.
- B. Include all items with operable parts, items requiring periodic maintenance and/or cleaning, and items requiring delivery of spare parts and/or extra materials to the Owner, whether or not explicitly identified in the corresponding specification section.
- C. Hard Copies: Submit two (2) each to the Hospital (1 to stay onsite at Building 22 and 1 for Maintenance records).
- D. Electronic Copies: Submit two (2) complete pdf file or files, identical to hard copies, on CD/DVD(s). (1) for WSH & (1) for DSHS. Bookmark all Divisions and Sections. Do not submit electronic copy until final approval of hard copy.
- E. Submit digital copies of photos taken during the course of construction on CD/DVD.

1.3 FORMAT – HARD COPY

- A. Size shall accommodate 8 1/2" X 11" sheets. Binder spine width shall not exceed 3".
- B. Cover and spline shall be embossed with:
 - 1. Name of Project.
 - 2. Name of Manual.
 - 3. Name of General Contractor.
 - 4. Month and year of Substantial Completion.
- C. Binding: Hard cover, 3-hole screw post binding.

D. Tabs:

1. Primary Tabs indicating CSI Division. In the event that no data is required for a specific Division, insert sheet indicating so.
2. Secondary Tabs indicating each Specification Section within a particular Division, unless no data is required for the entire Division, in which case Section tabs are not required.

1.4 FORMAT – DIGITAL COPY

- A. Furnish Owner with Adobe Acrobat compatible (*.pdf) file(s) on CD/DVD(s).
- B. Scan printed material not already in electronic format and insert into electronic Operation and Maintenance Manual.
- C. Organize electronic Operation and Maintenance Manual corresponding to hard copy Operation and Maintenance Manuals. Use same titles, content, and index following Specification Section numbers and titles. Bookmark all Divisions, Sections and Sub-sections.

1.5 CONTENTS

- A. Table of Contents:
 1. Arrange in same order as project specifications.
 2. Identify with specification number.
- B. Title Page:
 1. Name, address, phone number and email address of General Contractor and all Subcontractors.
 2. Name, address, phone number and email address of Architect.
 3. Date of Substantial Completion.
- C. Certificate(s) of Substantial Completion.
- D. Product Data:
 1. Item used shall be circled or otherwise clearly identified.
 2. All model numbers, sizes, colors and custom modifications shall be clearly identified.
 3. Include only sheets pertinent to project.
- E. List of suppliers with addresses, phone numbers and email addresses, per CSI Section.
- F. Receipts for spare parts, extra materials and all other equipment/items delivered to Owner.

1.6 REQUIRED INFORMATION

- A. Certificates of Compliance.
- B. Cleaning information and precautions.
- C. Preventative maintenance guidelines and activities.
- D. Parts list, reordering information and sources of supply.
- E. Inspection procedures.
- F. Operation instructions.
- G. Special and standard product or equipment warranties and service/maintenance agreements.
- H. System configurations and wiring schematics.
- I. Lubrication and servicing data and schedules.
- J. Recommended lamps.
- K. Emergency Instructions.
- L. MSDS sheets.
- M. Test data.
- N. Repair instructions.
- O. Instances or conditions which will affect validity of warranties with supporting company contact information.
- P. Other items identified in individual specific sections.

1.7 INSTRUCTION AND TRAINING OF OWNER'S PERSONNEL

- A. Submit preliminary Operation and Maintenance Manuals prior to Substantial Completion and prior to the start of any instruction or training of Owner's personnel.
- B. Submit a complete schedule of all training and instruction for review by Owner and Architect no later than 30 days prior to the anticipated date of the start of the training and instruction period. Indicate Division, Section, Sub-section, date, time, and instructor.
- C. Instruct Owner's designated personnel in maintenance, adjustment and operation of products included in Operation and Maintenance Manuals. Coordinate with additional requirements of related Sections.
- D. Demonstrate and instruct in classroom environment located at Project site.

1. Instructors: Qualified, authorized manufacturer's representatives, knowledgeable about the Project, specialist in trade and equipment involved.
 2. Meeting Time: As mutually agreed. Complete required training prior to submitting notification of Substantial Completion, without exception.
 3. Classroom Space: Mutually acceptable classroom within building facility.
- E. Items Requiring Seasonal Maintenance: Arrange and perform additional instruction within six months of Date of Substantial Completion.
- F. Hands-on-Training: Conduct at location utilizing actual in-place Work.
- G. Use completed Operation and Maintenance Manuals and Project Record Documents as the basis for instruction.
1. Review contents of Operation and Maintenance Manual in detail.
 2. Prepare and insert additional data when need for such data becomes apparent during instruction.
- H. Explain aspects of operations and maintenance. Cover such items as tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and renewal of finishes.
- I. Furnish additional instructional aids as handouts to attendees, including:
1. Written materials such as handouts, workbooks, and reference manuals. Supply one complete set for each attendee.
 2. Audio/visual materials: Supply in triplicate.
 3. All additional instructional aids shall be incorporated in the Final Operation and Maintenance Manuals (hard copies and electronic files).
- J. Training Program Material: Becomes property of Owner during program.

1.8 OPERATION AND MAINTENANCE DIGITAL VIDEO RECORDINGS

- A. Video record instruction and training, edit for clarity and correctness of instruction, and deliver to Owner prior to written notification of Final Completion.
- B. Furnish for all mechanical and electrical systems and other systems, equipment and products as required by individual related Specification Sections.
- C. Submit on CDs, DVDs or other formats as acceptable to the Owner.
- D. Provide printed labels for all CDs/DVDs., identifying:
1. Project Name.
 2. Date of training/instruction.
 3. Specification number and description/name of system.
 4. General Contractor, Subcontractor, and entity providing training.
 5. Date or anticipated date of Substantial Completion.

- E. Video Content: Cover recommended maintenance methods, procedures and materials in same order as presented in Maintenance Instructions section of Operation and Maintenance Manuals so that information is complementary and easy to follow.

- F. Video Demonstrations:
 - 1. Demonstrate in such a way as to make clear to maintenance and operations personnel how equipment should be operated and maintained.
 - 2. Zoom in with camera on identifying labels, valves, switches and other small features as needed to clarify locations of specific items and demonstrate specifics.
 - 3. Demonstrate manufacturer's recommended maintenance procedures such as servicing, lubricating, inspecting and testing.
 - 4. Include graphic and written information on video as needed to adequately demonstrate operation and maintenance procedures

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017823

SECTION 017836 - WARRANTY PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION

A. Requirements

- 1. Comply with General Conditions.
- 2. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the individual Specification Divisions.

B. Definitions

- 1. "Guarantee" and "warranty" are used interchangeably.
- 2. "Standard product warranties" are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- 3. "Special warranties" are written warranties required by or incorporated in the contract documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

C. Types

- 1. Categories of warranties required for the Work include:
 - a. Special project warranty issued by Contractor and, where required, countersigned by installer or installers and/or other recognized entity involved in performance of the Work.
 - b. Specified product warranty issued by a manufacturer or fabricator for compliance with requirements in contract documents.
 - c. Coincidental product warranty, available on a product incorporated into the Work, by virtue of manufacturer's publication of warranty without regard for application requirements (non-specified warranty).
 - d. Refer to individual Specification Sections for requirements of specified warranties.

D. Disclaimers and Limitations

- 1. Manufacturer's disclaimers and limitations on product warranties shall not relieve the Contractor of the general warranty on the Work under this Contract that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

2. The Contractor is obligated to comply with warranties under the Contract or at law, regardless of the terms and conditions of warranties of supplier, manufacturer and subcontractors extended to the Contractor.

1.3 SUBMITTALS

A. General

1. Prepare per Division 01 Section "Submittal Procedures" and as follows.
2. The Contractor's written warranty shall be submitted to the Architect on the "Contractor's Warranty" form attached to this section or in a similar approved format.
3. For Subcontractor warranties as specified, a warranty by each such Subcontractor, countersigned by the General Contractor, shall be submitted to the Architect on the "Subcontractor's Warranty" form attached to this section or in a similar approved format.

1.4 WARRANTY OBLIGATIONS

- A. Restore or remove and replace warranted Work to its originally specified condition at such time during warranty as it does not comply with or fulfill terms of warranty. Restore or remove and replace other Work that has been damaged by failure of warranted Work or which must be removed and replaced to gain access to warranted Work.
- B. Except as otherwise indicated or required by governing regulations, warranties do not cover damage to building contents (other than Work of contract) that results from failure of warranted Work.
- C. Cost of restoration or removal-and-replacement is Contractor's obligation without regard to whether Owner has already benefited from use of failing Work.

1.5 REINSTATEMENT OF WARRANTY

- A. Upon restoration or removal-and-replacement of warranted Work that has failed as determined by Architect, reinstate the warranty by issuing newly executed form, for at least the period of time of the original warranty.

1.6 OWNER'S RECOURSE

- A. Warranties and warranty periods do not diminish implied warranties and do not deprive Owner of actions, rights, and remedies otherwise available for Contractor's failure to fulfill requirements of the Contract Documents or rights and causes of action of or by the Owner available at law. Owner reserves right to reject coincidental product warranties considered to be conflicting with or detracting from requirements of the contract documents.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017836

CONTRACTOR'S WARRANTY

Page 1

Date: _____ Contractor: _____

Owner: Department of Social and Health Services

Address: Western State Hospital

9601 Steilacoom Blvd SW, Lakewood, WA 98498

Project: Western State Hospital – New Kitchen Commissary Pharmacy

_____ (Contractor), the undersigned, warrants for a period of one (1) year from the date of Final Completion, all Work performed under the provisions of the Agreement Between the Owner and Contractor.

_____ (Contractor) will remedy any defects appearing during the warranty period which are due to failure, faulty materials, poor workmanship, or other nonconformity with or omission from the contract documents.

The following subcontractors performed the Work or furnished materials subject to warranty:

Trade		
Contact Person	Subcontractor and Address	Phone
<hr/>		

CONTRACTOR'S WARRANTY

Page 2

Trade		
Contact Person	Subcontractor and Address	Phone

This warranty does not include holding the Contractor responsible for defects caused by unanticipated abuse; modifications not executed by the Contractor except when due to Contractor's failure to remedy defective conditions; improper or insufficient maintenance, and/or improper operation, except when performed by Contractor or when due to inadequate training of Owner's personnel; or wear and tear under normal usage.

Contractor: _____

Address: _____

Phone: _____

Contact Person: _____

Signature: _____

(Authorized Representative)

SUBCONTRACTOR'S WARRANTY

Date: _____ Subcontractor: _____

Owner: Department of Social and Health Services

Address: Western State Hospital

9601 Steilacoom Blvd SW, Lakewood, WA 98498

Project: Western State Hospital – New Kitchen Commissary Pharmacy

The General Contractor, _____, and the Subcontractor, _____, warranty for a period of _____ year(s), as specified in Section _____ of the contract documents, all Work performed under the provisions of the Agreement between the Owner and the Contractor. The undersigned will remedy any defects appearing during the warranty period which are due to failure, faulty materials, poor workmanship, or other nonconformity with or omission from the contract documents.

This warranty does not include holding the Contractor responsible for defects caused by anticipated abuse; modifications not executed by the Contractor except when due to Contractor's failure to remedy defective conditions; improper or insufficient maintenance, and/or improper operation, except when performed by Contractor or when due to inadequate training of Owner's personnel; or wear and tear under normal usage.

Trade: _____

Subcontractor: _____

Address: _____

Phone: _____

Contact Person: _____

Signature: _____

(Authorized Representative)

Contractor: _____

Address: _____

Signature: _____

(Authorized Representative)

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION

A. General Requirements

- 1. All work of this section is a part of the Contract and shall be provided at no additional cost to Owner.
- 2. Coordinate related requirements specified in other parts of the Project Manual.
- 3. Architect shall transfer as-built data provided by Contractor onto reproducible format.

B. Documents Required

- 1. Drawings, annotated as work progresses.
- 2. Project Manuals (specifications), annotated as work progresses.
- 3. Addenda.
- 4. Change Orders and other Contract modifications.
- 5. Architect's supplemental instructions, minor changes, clarifications and RFI responses.
- 6. Approved Shop Drawings, Product Data, and Samples
- 7. Field Test Records
- 8. Construction progress photographs on CD or DVD.

C. Maintenance of Documents & Samples - General

- 1. Store documents and samples in Contractor's field office apart from documents used for construction.
 - a. Provide files and racks for storage of documents.
 - b. Provide locked cabinet or secure storage space for storage of samples.
- 2. File documents and samples in accordance with Construction Specifications Institute (CSI).
- 3. Label each document "PROJECT RECORD COPY" in neat large printed letters. Maintain documents in orderly, clean and legible conditions. Do not use Record Documents for construction purposes.
- 4. Make documents and samples available at all times for inspection by Architect and Owner.

D. Marking Devices

1. Provide felt tip marking pens for recording information in color code. Color code legend on first sheet.

1.3 RECORDING

A. General

1. Project Record Documents shall be kept current and changes recorded concurrently as they are constructed. Do not conceal any work until required information is recorded.
2. Record Documents will be reviewed at weekly project meetings. Failure of the Contractor to maintain current Record Documents may result in the Contractor's delay of Final Completion of the Work, at the Contractor's expense.

B. Record (As-Built) Drawings

1. During the construction period, Contractor shall include on the "Project Record Copy" set of prints the following information as a minimum:
 - a. The size and location of all concealed or underground piping, conduit, ductwork and other utilities and appurtenance concealed in the construction, referenced to visible and accessible features of the site.
 - b. Details not on original Contract Drawings.
 - c. All approved deviations from the specifications and drawings, including addenda items, field orders, and change orders. Indicate change item numbers.
 - d. The location of any visible objects relocated due to interferences, or requested relocations submitted and approved on shop drawings.
2. Contractor shall remain available during closeout period to assist Architect with Record Document interpretation, correction and transfer of as-built drawings to reproducible format.
3. Record drawings shall comprise Civil, utility and survey drawings, plus all special equipment, all of which form a part of the Contract Documents.

C. Record Project Manuals

1. Maintain one copy of each Project Manual including addenda, Change Orders and similar modifications issued in printed form during construction, and mark-up variations in actual work in comparison with text and details of Project Manuals and modifications as issued.
2. Give particular attention to substitutions, selection of options, changes in details and schedules, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable.
3. Legibly mark each Section to record Manufacturer, trade name, catalog number and supplier of each equipment item actually installed.

4. Addenda items and Change Orders associated with and/or affecting the Project Manuals shall be properly posted (i.e., cut out and placed in the Project Manuals at appropriate locations) and referenced in the record set.

D. Shop Drawings

1. Maintain as Record Documents; legibly annotate to record changes made after review.
2. Include subcontractor reproducible shop drawings for all special equipment including utilities, ground source heat pump piping and wells, and others as deemed appropriate. Record Drawing shop drawings shall be easily reproducible as appropriate and approved.

E. Record Product Data

1. Maintain one copy of each product data submittal, and mark-up variations in actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation.
2. Give particular attention to concealed products and portions of the work that cannot otherwise be readily discerned at a later date by direct observation. Note related Change Orders and mark-up of Record Drawings and Project Manuals.

1.4 SUBMITTALS

A. General

1. Contractor shall, after a preliminary review by Architect, submit the complete set of Record Documents to Architect for review. Contractor shall make all corrections requested, and return the Documents to Architect. All such Documents must be submitted together, prior to Final Completion, and this submittal shall be a condition precedent to Architect's Certification of final Application for Payment.

B. Submittal

1. Following Substantial Completion, prior to Final Completion and upon completion of final mark-up of Record Documents, deliver Record Documents to Architect:
 - a. One set of plans showing all changes incorporated in the Work.
 - b. One set Project Manuals showing all changes and information incorporated in the Work as specified.
 - c. One set shop drawings and Record Product Data with all information recorded as specified.
 - d. Surveyor's certificate per Division 01 Section "Field Engineering."

- C. Architect shall be responsible for transfer of Contractor as-built information to reproducible format.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017839

SECTION 018113- SUSTAINABILITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This project will apply to the U S Green Building Council for building certification under the Leadership in Energy and Environmental Design (LEED) Green Building Rating System® Version 2009. This rating system sets a standard definition for a commercial green building.
 - 1. The system consists of five environmental categories containing 8 prerequisites and 46 credits, and additional categories for design innovation and regional priority. Each prerequisite and credit identifies the intent, requirements and submittals to achieve its specific goal.
 - 2. Points are awarded for accomplishments in each credit area, and are added together in the LEED Scorecard to arrive at a total score for the building. Four award levels of achievement are possible: Certified (40-49 points), Silver (50-59 points), Gold (60-79 points) and Platinum (80 or more points).
 - 3. A LEED rating is awarded based on the U S Green Building Council's review of the LEED Application that is created by the owner, design and construction team.
- B. Related Sections: The following sections contain requirements related to this section:
 - 1. Division 01 Section "Project Meetings" for LEED coordination meetings.
 - 2. Division 01 Section "Submittal Procedures" for LEED submittals.
 - 3. Division 01 Section "Product Requirements" for LEED substitutions.
 - 4. Division 01 Section "Construction Waste Management."
 - 5. Division 01 Section "Indoor Air Quality Requirements."
 - 6. Division 01 Section "General Commissioning Requirements".

1.3 REFERENCES

- A. There are three documents provided by the U S Green Building Council to explain the LEED Green Building Rating System and provide guidance to the achievement of each prerequisite and credit. Those documents may be obtained from their website at www.usgbc.org, and are:
 - 1. LEED-NC 2009 Green Building Rating System for New Construction and Major Renovations. Document that briefly describes each LEED prerequisite and credit that can be downloaded free of charge.
 - 2. LEED-NC 2009 Reference Guide. Document that includes the Rating System and expands on each topic to include green building issues, design approaches, calculation methodologies, references, definitions and case studies. This document is available for a fee from the website.

3. LEED 2009 Online Credit Forms. PDF form that prompts the responsible party to declare that the requirements of each prerequisite and credit are met. This document can be accessed by registered users to the LEED Online application system.

1.4 REQUIREMENTS

- A. This project is targeted to earn a LEED Silver rating from the U S Green Building Council.
- B. To achieve the LEED rating, applicant projects must satisfy all of the prerequisites and the number of credit points defined in the project LEED Scorecard. (See LEED Scorecard following this Section for reference only)
- C. LEED requirements have been incorporated into the Contract Documents in support of the credits identified in the LEED scorecard. The specifications contain product criteria required to achieve particular LEED credits.
- D. Achievement of LEED requirements are documented through LEED submittals which are provided to the U S Green Building Council in the LEED application. Contractor submittals are required to meet the LEED requirements. A complete list of required LEED submittals is provided in Section 01 33 23.
- E. Designate a 'LEED Coordination Manager' from a permanent member of the construction team. The LEED Coordination Manager's responsibilities shall include, but are not limited to calculations, collection and collation of all materials to be turned over to Owner's LEED Representative for inclusion in the LEED Application.

1.5 COORDINATION

- A. LEED Coordination: Coordinate LEED requirements, submittals and responsible parties, as required by LEED Coordination meetings defined in Division 01 Section "Project Meetings."
- B. Air Quality Management Coordination: Coordinate per Division 01 Section "Indoor Air Quality Requirements."
- C. Construction Waste Management Coordination: Coordinate recycling of materials with Owner, as required, to conform to the Construction Waste Management Plan defined in Division 01 Section "Construction Waste Management."
- D. Commissioning Coordination: Coordinate with the project's commissioning provider to complete required commissioning process per Division 01 Section "General Commissioning Requirements."
- E. Site and Tree Protection: Protection of soil, habitat and landscape amenities shall be coordinated per Division 32 Section "Landscape Installation."
- F. Erosion and Sedimentation Control Coordination: Coordinate erosion and sedimentation control, as required, to conform to the Erosion and Sedimentation Control Plan defined in Division 01 Section "Erosion Control."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor participation is required to meet the LEED requirements.
- B. Correction of work nonconforming with LEED credit requirements shall be performed at Contractor's expense, except for any work otherwise conforming to the contract documents. Contractor shall provide the necessary documentation to show compliance of corrected work. Owner's LEED Representative will be the sole judge in determining compliance with LEED credit requirements.
- C. LEED Kick-Off Meeting: In accordance with Division 01 Section "Project Meetings," a two-hour LEED orientation session for construction forces will be scheduled by the Owner's LEED Representative and the Contractor's LEED Coordination Manager, at a mutually agreed date and time between Preconstruction Meeting and start of construction.
- D. Session will be led by a LEED accredited professional familiar with Project. Attendance is required of Owner's Representatives, Commissioning Agent, Architect, Contractor's project manager, superintendent, Contractor's LEED Coordination Manager, project engineers, and representatives of primary subcontractors. Agenda will include:
 - 1. Green building design principles and LEED rating system.
 - 2. Green building features and requirements of this Project.
 - 3. Review of Contractor's responsibility for quality control related to LEED.
 - 4. Review of submittals required for LEED certification.
 - 5. Contractor's responsibility for green building construction practices and documentation.

3.2 LEED SCORECARD – REFER TO NEXT PAGE

END OF SECTION 018113

50	11	5	Total Project Score	Possible Points 110
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Certified: 40 to 49 points Silver: 50 to 59 points Gold: 60 to 79 points Platinum: 80 to 110 points

13			Sustainable Sites		Possible Points	26
Y	?	N				
Y			SSp1 Construction Activity Pollution Prevention	Req'd		
1			SSc1 Site Selection	1		
		N/A	SSc2 Development Density and Community Connectivity	5		
		N/A	SSc3 Brownfield Redevelopment	1		
		N/A	SSc4.1 Alternative Transportation: Public Transportation Access	6		
1			SSc4.2 Alternative Transportation: Bicycle Storage and Changing Rooms	1		
3			SSc4.3 Alternative Transportation: Low-Emitting and Fuel-Efficient Vehicles	3		
2			SSc4.4 Alternative Transportation: Parking Capacity	2		
1			SSc5.1 Site Development: Protect or Restore Habitat	1		
1			SSc5.2 Site Development: Maximize Open Space	1		
1			SSc6.1 Storm water Design: Quantity Control	1		
1			SSc6.2 Storm water Design: Quality Control	1		
		N/A	SSc7.1 Heat Island Effect: Nonroof	1		
1			SSc7.2 Heat Island Effect: Roof	1		
1			SSc8 Light Pollution Reduction	1		

5			1		2		Water Efficiency		Possible Points	10
Y	?	N								
Y			WEp1 Water Use Reduction	Req'd						
2			WEc1 Water-Efficient Landscaping	4						
		2	WEc2 Innovative Wastewater Technologies	2						
3	1		WEc3 Water Use Reduction	4						

5			8		Energy and Atmosphere		Possible Points	35
Y	?	N						
Y			EAp1 Fundamental Commissioning	Req'd				
Y			EAp2 Minimum Energy Performance	Req'd				
Y			EAp3 Fundamental Refrigerant Management	Req'd				
4	4		EAc1 Optimize Energy Performance	19				
		N/A	EAc2 On-Site Renewable Energy	7				
		N/A	EAc3 Enhanced Commissioning	2				
		2	EAc4 Enhanced Refrigerant Management	2				
1			EAc5 Measurement and Verification	3				
		2	EAc6 Green Power	2				

Y	YES - Credit included in design or planned for pursuit
?	MAYBE - Credit will potentially be achieved or pursued
N	NO - Credit not pursued or not applicable

6			1		Materials and Resources		Possible Points	14
Y	?	N						
Y			MRp1 Storage and Collection of Recyclables	Req'd				
		N/A	MRc1.1 Building Reuse: Maintain Existing Walls, Floors, and Roof	3				
		N/A	MRc1.2 Building Reuse: Maintain Interior Nonstructural Elements	1				
2			MRc2 Construction Waste Management	2				
		N/A	MRc3 Materials Reuse	2				
2			MRc4 Recycled Content	2				
2			MRc5 Regional Materials	2				
		N/A	MRc6 Rapidly Renewable Materials	1				
		1	MRc7 Certified Wood	1				

14			1		Indoor Environmental Quality		Possible Points	15
Y	?	N						
Y			EQp1 Minimum Indoor Air Quality Performance	Req'd				
Y			EQp2 Environmental Tobacco Smoke (ETS) Control	Req'd				
1			EQc1 Outdoor Air Delivery Monitoring	1				
1			EQc2 Increased Ventilation	1				
1			EQc3.1 Construction IAQ Management Plan, During Construction	1				
1			EQc3.2 Construction IAQ Management Plan, Before Occupancy	1				
1			EQc4.1 Low-Emitting Materials: Adhesives and Sealants	1				
1			EQc4.2 Low-Emitting Materials: Paints and Coatings	1				
1			EQc4.3 Low-Emitting Materials: Flooring Systems	1				
1			EQc4.4 Low-Emitting Materials: Composite Wood and Laminate Adhesives	1				
1			EQc5 Indoor Chemical and Pollutant Source Control	1				
1			EQc6.1 Controllability of Systems: Lighting	1				
		1	EQc6.2 Controllability of Systems: Thermal Comfort	1				
1			EQc7.1 Thermal Comfort: Design	1				
1			EQc7.2 Thermal Comfort: Verification	1				
1			EQc8.1 Daylight and Views: Daylight	1				
1			EQc8.2 Daylight and Views: Views	1				

4			2		Innovation and Design Process		Possible Points	6
Y	?	N						
1			IDc1.1 Innovation in Design: Exemplary Performance: SSc5.2	1				
1			IDc1.2 Innovation in Design: Green Building Education	1				
1			IDc1.3 Innovation in Design: Green Cleaning Policy	1				
		1	IDc1.4 Innovation in Design: TBD	1				
		1	IDc1.5 Innovation in Design: TBD	1				
1			IDc2 LEED Accredited Professional	1				

3			1		Regional Priority		Possible Points	4
Y	?	N						
		N/A	RPc1.1 Regional Priority - EAc1: 48%	1				
		N/A	RPc1.2 Regional Priority - EAc2: 13%	1				
		1	RPc1.3 Regional Priority - MRc7	1				
1			RPc1.4 Regional Priority - SSc1	1				
1			RPc1.5 Regional Priority - SSc5.1	1				
1			RPc1.6 Regional Priority - SSc6.1	1				

SECTION 018119- INDOOR AIR QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. The Contractor shall create and implement a construction indoor air quality management plan to maintain indoor air quality by controlling dust and pollutants.
- B. Related Sections: The following sections contain requirements related to this section:
 - 1. Division 01 Section "Project Meetings" for LEED coordination meetings.
 - 2. Division 01 Section "Submittal Procedures" for LEED submittals.
 - 3. Division 01 Section "Product Requirements" for LEED substitutions.
 - 4. Division 01 Section "General Commissioning Requirements".
 - 5. Division 23 Section "Indoor Air Quality Assurance" for building flush-out requirements.
 - 6. Divisions 03 – 23 Sections: Individual sections that involve finish materials that are located inside the vapor barrier as well as auxiliary finishing materials installed within the vapor barrier. This includes, but is not limited to, adhesives, sealants, paints, primers, carpets and composite wood products

1.3 REFERENCES

- A. Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, Second Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
- B. Filtration media: ASHRAE 52.2-1999.
- C. Adhesives, sealants and sealant primers: South Coast Air Quality Management District (SCAQMD) Rule 1168 requirements, rules in effect on July 1, 2005.
- D. Aerosol adhesives: Green Seal Standard for Commercial Adhesives GS-36, Requirements in effect on October 19, 2000.
- E. Architectural paints, coatings & primers: Green Seal Standard GS-11, Paints, First Edition, May 20, 1993.
- F. Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Green Seal Standard GC-03, Anti-Corrosive paints, Second edition, January 7, 1997.
- G. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to interior elements: South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
- H. Carpet: Carpet and Rug Institute's Green Label Plus program.
- I. Carpet cushion: Carpet and Rug Institute's Green Label program.
- J. Hard-surface flooring, gypsum board, insulation, acoustic ceiling systems, wall base, wall coverings: California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350).

- K. Acoustic Indoor Air Quality Testing: United States EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air.

1.4 REQUIREMENTS

- A. Develop and implement an Indoor Air Quality Management Plan during construction that meets or exceeds the minimum requirements of the SMACNA IAQ Guideline for Occupied Buildings under Construction, Second Edition 2007, Chapter 3. The required Best Management Practices are summarized in Part 3 of this Section.
- B. Protect stored on-site or installed absorptive materials from moisture damage.
- C. Use filtration media at each return air grill if air handling systems are to be used during construction.
- D. Conduct a building flush-out or a baseline indoor air quality test procedure consistent with Part 3 of this Section.
- E. Use low- or no-emitting adhesives, sealants, paints, primers, carpets and composite wood products within the vapor barrier. Refer to the Requirements within this Section.

1.5 SUBMITTALS

- A. Make submittals in accordance with Division 01 Section “Submittal Procedures.”
- B. IAQ Management Plan: Within 60 working days after receipt of Notice of Award of Bid, or prior to HVAC work, whichever occurs sooner, the Contractor should submit 3 copies of the Draft IAQ Management Plan to the Owner’s LEED Representative for approval.
 - 1. The Draft Plan must meet or exceed the SMACNA Best Management Practices described in Part 3 of this Section.
 - 2. In the Plan designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the IAQ Management Plan for the Project.
 - 3. Once the Owner’s LEED Representative has determined which of the BMPs contained in the above draft Plan are acceptable, the Contractor shall submit, within 14 working days, a Final IAQ Management Plan. The Contractor shall distribute copies of the IAQ Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect.
- C. IAQ Management Reports: The Contractor shall submit with each Progress Report a summary of IAQ Management issues. The Summary shall be submitted on a form approved by the Owner.
- D. Provide a minimum of 18 photographs (3 each on 6 separate occasions) of construction IAQ management measures such as protection of ducts and on-site stored or installed absorptive materials.
- E. Provide cut sheets of filtration media used during construction and installed immediately prior to occupancy with MERV values highlighted.

- F. Submit one of the following.
 - 1. A description of the building flush-out procedures aligned to the requirements in Division 23 Section “Indoor Air Quality Assurance” (may be included in the IAQ Management Plan), calculations demonstrating how the number of days of flush-out was determined, and dates of flush-out. Provide cut sheets of filtration media installed during flush-out and replaced immediately prior to occupancy, with MERV values highlighted.
 - 2. A copy of the indoor air quality testing results demonstrating that the IAQ testing protocol has been met.

1.6 BUILDING FLUSHOUT MILESTONE DATE

- A. The General Contractor shall include a separate milestone date on the CPM Schedule that indicates targeted date for the start of building flushout process.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill.
- B. After construction ends, and prior to occupancy, replace filtration media with new Minimum Efficiency Reporting Value (MERV) 13 filtration media.
- C. Use low-emitting products within the vapor barrier. This includes, but is not limited to:
 - 1. Low or no-VOC adhesives and sealants such as multipurpose construction, glazing, pvc, carpet and pad, sheet flooring, tile floor, wood floor, cove base, countertop, tile countertop, grout sealant, cabinetry, laminate, sub-base, ductwork, fire caulk, acoustical and plumbing. VOC maximum limits are as shown in the VOC Limits table.
 - 2. Carpet systems shall meet or exceed the requirements of the Carpet and Rug Institute’s Green Label Plus Indoor Air Quality Test Program.
 - 3. Resilient flooring, engineered and/or prefinished wood flooring, and tile flooring with factory-applied organic coatings/sealants shall comply with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.
 - 4. Gypsum board, acoustic ceiling tile, insulation, wall coverings, and wall base shall comply with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

5. Composite wood and agrifiber products, including core materials, shall contain no added urea-formaldehyde resins. Adhesives used in field and shop-fabricated assemblies containing these products shall contain no added urea-formaldehyde resins. Products may include plywood, millwork, composite and solid doors, cabinetry, crown moldings, wood paneling and built in furnishings.
6. VOC Limits for LEED 2009:

SCAQMD Rule 1168, Adhesive and Sealant Application

Architectural Applications	VOC Limit [g/L less water]
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Wood Flooring Adhesives	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile Adhesives	65
VCT & Asphalt Adhesives	50
Drywall & Panel Adhesives	50
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100

Substrate Specific Applications	VOC Limit [g/L less water]
Metal to Metal	30
Plastic Foams	50
Porous Material (except wood)	50
Wood	30
Fiberglass	80

Sealant Primers	VOC Limit [g/L less water]
Architectural Non Porous	250
Architectural Porous	775
Other	750

Specialty Applications	VOC Limit [g/L less water]
PVC Welding	510
CPVC Welding	490
ABS Welding	325
Plastic Cement Welding	250
Adhesive Primer for Plastic	550
Contact Adhesive	80
Special Purpose Contact Adhesive	250
Structural Wood Member Adhesive	140
Top & Trim Adhesive	250
Sheet Applied Rubber Lining Operations	850

Green Seal GS-36, Commercial Adhesives

Aerosol Adhesives	VOC Limit by Weight [%]
General Purpose Mist Spray	65%
General Purpose Web Spray	55%
Special Purpose Aerosol Adhesive	70%

SCAQMD Rule 1168, Adhesive and Sealant Application

Sealants	VOC Limit [g/L less water]
Architectural	250

Green Seal GS-11, Paints

Architectural Paints & Primers	VOC Limit [g/L less water]
Flats	50
Non-Flats	150

Green Seal GC-03, Anti-Corrosive Paints

Anti-Corrosive Paints	VOC Limit [g/L less water]
Anti-Corrosive/ Anti-Rust for Ferrous Metal Substrates	250

SCAQMD Rule 1113, Architectural Coatings

Architectural Finishes & Coatings	VOC Limit [g/L less water]
Bond Breakers	350
Clear Wood Varnish & Sanding Sealers	350
Clear Brushing Lacquer	680
Concrete-Curing Compounds	350
Dry-Fog Coatings	400
Fire Retardant Coatings, Clear	650
Fire Retardant Coatings, Pigmented	350
Floor Coatings	100
Graphic Arts (Sign) Coatings	500
Industrial Maintenance Coatings	250
Industrial Maintenance Primers, Zinc-Rich	340
Japans / Faux Finish coatings	350
Lacquer Sealer	550
Magnesite Cement Coatings	450
Mastic Coatings	300
Metallic Pigmented Coatings	500
Multicolor Coatings	250
Pretreatment Wash Primers	420
Primers, Sealers, and Undercoaters	200
Quick-Dry Enamels	250
Quick-Dry Primers, Sealers, and Undercoaters	200
Recycled Coatings	250
Rust Preventive Coatings	400
Shellacs, Clear	730
Shellacs, Pigmented	550
Stains	250
Waterproofing Sealers	250
Waterproofing Concrete/Masonry Sealers	400
Wood Preservatives	350

Laminating adhesives	No added Urea-Formaldehyde
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PART 3 - EXECUTION

3.1 GENERAL

A. Many Best Management Practices are available to maintain IAQ during construction or demolition. The pros, cons, and limitations of each available option should be considered to identify the most effective and most efficient approaches for a particular job. When designing the Plan, the Contractor may use more than one of these practices (simultaneously or phased in) as work progresses. In general, the steps include:

1. Containing the work area
2. Modifying HVAC operation
3. Reducing emissions
4. Intensifying housekeeping
5. Scheduling material delivery to avoid contamination
6. Protecting stored and installed absorptive materials from contamination.

3.2 REQUIRED IAQ MANAGEMENT BMPS

A. Mechanical Systems:

1. Protection: All HVAC equipment must be protected from collecting dust and contaminants that can be collected in the system and later be released. Specific HVAC protection requirements generally apply to the return side, central filtration, or supply side of the system.
2. Return Side: The return side of an HVAC system is, by definition, under negative pressure and thus capable of drawing in nearby construction dust and odor. Special attention must be paid to the location of any return vents, return ducts, ceiling plenums, return shafts, VAV plenum intakes, window units, and transfer vents as well as that portion of the air handler which is upstream of the central fan. When possible, the entire system should be shut down during heavy construction or demolition that generates dust and airborne particles.
 - a. All return system openings in, or immediately adjacent to, the construction area should be sealed with plastic.
 - b. When the system must remain operational during construction, temporary filters should be added where necessary (e.g., on grills to return air shaft). Filters used during construction must have a minimum rating of MERV 8 and must receive frequent periodic maintenance.
 - c. Replace the filters at the end of the project with MERV 13 filters. Provide MERV 13 filters to process both return and outside air that is to be delivered as supply air. Verify that equipment is capable of accepting MERV 13 filters, or notify the Owner's LEED Representative.
 - d. When the general system must remain operational, the heaviest work areas should be dampered off or otherwise blocked if temporary imbalance of the return air system does not create a greater problem.
 - e. The mechanical room should not be used to store construction or waste materials.

3. Supply Side:
 - a. Diffusers, terminal units, and ducts may be adequately protected in most cases where the above measures are implemented. When the system is off for the duration of construction, diffusers and window units should also be sealed with plastic for further protection.
 - b. Ducts, diffusers, and window units should be inspected upon completion of the work for the amount of deposited particulate present and cleaned where needed. If significant dust deposits are observed in the system during construction, some particulate discharge can be expected during start-up. When such a discharge is only minor, delaying re-occupancy long enough to clean up the dust may be sufficient. In more severe cases, installing temporary coarse filters on diffusers or cleaning the ducts may be necessary. The condition of the main duct should be checked whenever visible particles are discharged from the system.
- B. Materials Handling: Protect construction materials from contamination and pollution from contact with construction dust, debris, fumes, solvents, and other pollutants.
 1. The design of each system must be evaluated in detail to determine how it may be affected by odor and dust from the project (including site egress, staging areas, etc.).
 2. Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
 3. Protect stored on-site or installed absorptive materials from moisture damage.
 4. Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
 5. Schedule delivery of materials to minimize the duration of on-site storage.
- C. VOC Control: Schedule installation of materials to minimize contamination of absorptive materials with VOCs, solvents, dust, etc. (For example, install carpet after painting has been completed, since carpet can absorb VOCs released while the paint dries).
 1. All dry furnishings and materials (such as carpet, floor tile, acoustical tile, textiles, office furniture, wood shelving, etc.) shall be allowed to "air-out" or pre-condition prior to installation.
 2. "Bake-outs" of furnishings and construction materials is not recommended due to questionable effectiveness and potential for damage.
 3. Reduce exposure to VOCs as follows:
 - a. An enclosed tanker is preferable to an open kettle for roofing.
 - b. Containers of wet products should be kept closed as much as possible.
 - c. Waste materials that can release odor or dust should be covered or sealed.
 - d. Applying a sealer may control a surface that is persistent odor source.
- D. Inspection: Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection.
 1. Ductwork and appurtenances should be inspected upon completion of the work for the amount of deposited particulate present and cleaned where needed.

2. Both highly specialized equipment and professional expertise may be required to ensure that dust is effectively removed and contained.
 3. The sequence in which duct cleaning occurs in the overall construction process needs to be carefully considered to avoid recontamination.
- E. Modifying Equipment Operation: Use of equipment may need to be restricted in order to meet IAQ objectives. This could involve substituting cleaner equipment or simply changing operating Procedures. Examples of such controls include:
1. Restricting traffic volume or prohibiting idling of motor vehicles where emissions could be drawn into occupied areas.
 2. Switching from diesel to biodiesel or bottled gas for equipment such as generators or forklifts (emissions are cleaner but still potentially harmful under some circumstances). Use of electric forklifts and other equipment should be considered when feasible, since they do not burn fossil fuels, thus eliminating exposure to combustion gas emissions.
- F. Use low-toxic cleaning supplies for surfaces, equipment and worker's personal use. Options include Green Seal, citrus-based or soy-based solvent cleaners. Refer to Green Seal website for a list of approved products at <http://www.greenseal.org/findaproduct/index.cfm>.
- G. Changing Work Practices: For some demolition tasks (e.g., paint stripping) there may be techniques available that produce less airborne dust. Some painting techniques release fewer odors. Some cleaning practices raise less dust.
- H. Use wet sanding for gypsum assemblies. Exception: Dry sanding allowed subject to Owner approval of the following measures.
1. Full isolation of space under finishing.
 2. Plastic protection sheeting is installed to provide air sealing during the sanding
 3. Closure of all air system devices and ductwork
 4. Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust
 5. Worker protection provided.
- I. Local Exhaust: Pollution sources can be directly exhausted to the outside. This may be done through an exhaust system already available in the building or more often by a portable fan vented to the outside and attached to the work site by flex duct. Depending on the nature of the material and the location of the exhaust, special filtration of the exhaust may or may not be necessary. Any emissions to the outside must be in compliance with applicable regulations and should be directed well away from intakes.
- J. Air Cleaning: Where exhaust is not feasible, local re-circulation of air through a portable air cleaner may be effective. The type of filter should be suitable for the material being controlled (e.g., charcoal or potassium permanganate for many odors, a moderate to high efficiency filter for dust).

3.3 BUILDING FLUSHOUT OR IAQ TESTING

- A. At the option of the Contractor conduct either one of the following.

1. Building Flushout: After point of substantial completion, but prior to occupancy, conduct a building flushout, as follows:
 - a. Install all interior finishes.
 - b. Complete dust- or chemical- producing activities such as painting, sealing, and sanding prior to initiating flushout. Punchlist items must be complete prior to commencement of flushout.
 - c. Remove MERV 8 filtration media installed during construction. Install new MERV 13 filtration media. If equipment is not designed to accommodate MERV 13, create temporary fitting.
 - d. Use ONE of the following flushout methods:
 - 1) Prior to occupancy, provide a total volume of 14,000 ft³ of outdoor air per ft² of floor area while maintaining an internal temperature of at least 60°F and relative humidity no higher than 60%.
 - 2) Prior to occupancy, provide a minimum of 3,500 ft³ of outdoor air per ft² of floor area to the space. During occupancy, provide a minimum of 0.30 cfm per ft² of outside air or the design minimum outside air ventilation rate, whichever is greater, until a total of 14,000 ft³ per ft² has been delivered. During each day of the flushout period, the flushout ventilation rate must begin a minimum of three hours prior to occupancy and continue while the space is occupied.
 - 3) Note: Temporary fans may be used to accomplish this flushout, as long as the required air quality, temperature and humidity targets are maintained.
 - e. Flushout may be conducted in lieu of IAQ Testing.
2. IAQ Testing: Conduct a baseline indoor air quality testing procedure consistent with United States EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air. After point of substantial completion, but prior to occupancy, conduct a IAQ Testing, as follows:
 - a. Randomly select sampling points in each portion of the building that is served by a separate ventilation system, with at least one sampling point for every 25,000 square feet, or for each contiguous floor area, whichever is larger.
 - b. Collect the air samples between 3 feet and 6 feet from the floor, with all samples collected over a minimum 4-hour period.
 - c. From the air samples collected, measure the maximum concentration levels for the chemical contaminants listed below:
 - 1) Carbon Dioxide (CO) 50 parts per billion.
 - 2) Formaldehyde 27 parts per billion.
 - 3) Particulates 50 micrograms per cubic meter.
 - 4) Total Volatile Organic Compounds (TVOCs) of 500 micrograms per cubic meter.

- 5) 4-PCH of 6.5 micrograms per cubic meter. This test is required only if carpets and fabrics with styrene butadiene rubber (SBR) latex backing material are installed in the building.
 - 6) Carbon Monoxide (CO) of 9 part per million or no greater than 2 parts per million above outdoor levels.
- d. For each building area where the maximum concentration limits are exceeded conduct a partial building flushout, and then retest the specific parameter(s) exceeded to confirm the requirements are achieved. Repeat procedure until all requirements have been met. When retesting, air samples should be taken from the same location as the first test.
 - e. Provide a copy of the IAQ testing results indicating that the maximum chemical contaminate concentration requirements are not exceeded.
 - f. Testing may be performed in lieu of the building flushout.

END OF SECTION 018119

SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Description of Work
2. Payment Requirements and Commissioning Schedule of Values
3. Commissioning Coordination and Meetings
4. Scheduling Commissioning Activities
5. Submittals
6. Duties of Commissioning Authority
7. Duties of Contractor
8. Duties of Contractor's Commissioning Coordinator
9. Back-Charging Provisions
10. Documentation Requirements
11. Start-up Requirements
12. Installation Verification Requirements
13. Functional Testing Requirements
14. Commissioning Issue Documentation and Correction
15. Performance Period
16. Project Closeout
17. Seasonal Testing
18. Near Warranty End Review

B. Related Sections:

1. General Requirements to include the following sections, exact titles may vary.

LEED and sustainability requirements
Indoor Air Quality Management
Project Management and Coordination
Submittals
Closeout Procedures
Operation and maintenance Data
Demonstration and training

2. The following sections specify the commissioning activities for this project:

11 08 00 Commissioning of Equipment
20 08 00 Commissioning of Mechanical
21 08 00 Commissioning of Fire Suppression
22 08 00 Commissioning of Plumbing
23 08 00 Commissioning of HVAC
25 08 00 Commissioning of Controls
26 08 00 Commissioning of Electrical
28 08 00 Commissioning of Electronic Safety and Security

3. All sections related to the following commissioned systems may contain start-up, testing and/or commissioning related activities:

DIVISION 11 – EQUIPMENT

Walk-in Coolers

DIVISION 20 – MECHANICAL

Testing, Adjusting and Balancing

DIVISION 21 – FIRE SUPPRESSION

All Fire Suppression Systems

DIVISION 22 – PLUMBING

Domestic Hot Water Heaters & Circulators

DIVISION 23 – HVAC

All HVAC Systems

DIVISION 25 – INTEGRATED AUTOMATION

All Building Automation and Control Systems

DIVISION 26 – ELECTRICAL

Lighting Control

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Fire Alarm

1.2 DESCRIPTION OF WORK

- A. Work includes the completion of formal commissioning procedures on selected equipment and systems as outlined in the paragraph Related Sections above. Commissioning is defined as the process of verifying and documenting that the installation and performance of selected building systems meet the specified design criteria and therefore satisfies the design intent and the Owner's operational needs. The Contractor shall be responsible for participation in the commissioning process as outlined herein, and in subsequent sectional references and attachments throughout the Contract Documents. Commissioning procedures will be designed and conducted under the direction of a Commissioning Authority (CxA) hired by the Owner.
- B. This section contains the general requirements for commissioning and a description of the commissioning process to be applied across all commissioned systems.

1.3 PAYMENT

- A. Equipment and systems shall not be accepted by the Owner, and final payment shall not be made by the Owner, until commissioning activities identified in the specifications are complete, commissioning issues are resolved to the Owner's satisfaction and the performance period standards have been met including seasonal testing.
- B. Payment is subject to the conditions of the Actual Damages clause of the General Conditions.

1.4 COMMISSIONING COORDINATION AND MEETINGS

- A. A representative for the Contractor, each commissioned system Contractor and the Contractor's Commissioning Coordinator (CCC) shall attend scheduled commissioning meetings as required.

1.5 SCHEDULE

- A. The Contractor is responsible for coordination and scheduling of commissioning activities into the master schedule. The schedule shall contain the following activities and detail as a minimum.
 - 1. Contractor review and comment on preliminary commissioning plan documents
 - 2. Start-up Plan Development
 - 3. Start-up Activities by Equipment and Systems
 - 4. Installation Verification Activities by Equipment and Systems
 - 5. Functional Testing Activities by Equipment and Systems
 - 6. Training
 - 7. O&M
 - 8. Seasonal Testing
- B. The CCC shall develop and maintain a 2-week look-ahead schedule of commissioning activities including, but not limited to: meetings, start-up, installation verification, Functional Performance Testing (FPT) and FPT demonstration. The schedule shall be updated and distributed weekly, or if any currently scheduled activities in the 2-week period change.
- C. The Owner and the CxA will allocate their time based on the 2-week look-ahead schedule. If the Owner or CxA is not available for the scheduled activity then the Contractor may proceed as scheduled. If a scheduled activity does not take place due to lack of Contractor participation or inaccurate scheduling, the Contractor is subject to back-charging as outlined herein.

1.6 SUBMITTALS

- A. Commissioning Documentation: Provide one copy of submittals in addition to those quantities specified elsewhere. Include the manufacturer's recommended installation and start-up procedures with associated checklists for each unique piece of equipment under a separate tab titled "Installation/Start-up". These procedures and forms shall be for the specific piece of equipment to be provided.
- B. The Contractor shall provide the CxA with copies of approved submittals, manufacturer's recommended installation/start-up documents, proposed testing formats, training plans, as-built

documentation, O&M Manuals and other commissioning related materials as requested by the CxA. The CxA will review and approve this material for commissioning related activities.

- C. The CCC is responsible for managing the submittal process with the CxA. A tracking document for selected submittals is included in the schedules at the end of the individual divisional commissioning specifications for systems to be commissioned. These schedules outline activities that will require specific submittal information by the Contractor. Assignment of Contractors responsible for commissioned systems and due dates will be determined at the initial commissioning coordination meeting.
- D. O&M manuals for each piece of commissioned equipment are to be submitted with the proposed installation, testing and start-up documents.
- E. The Contractor is responsible for providing the CxA with copies of the following information for inclusion in the Systems Manual. The CxA will review this material for compliance with Project Documents and will note and report issues for resolution by the responsible party. The CxA will compile the final Systems Manual based on the submitted documentation.
 - 1. As-built documents
 - 2. Description of systems, including capabilities and limitations
 - 3. Operating procedures for all normal, abnormal, and emergency modes of operation
 - 4. Sequence of operation as actually implemented, with control systems data including all set points, calibration data, etc. This includes but is not limited to the building automation system, packaged controls, programmable logic controllers and lighting controls.
 - 5. Location of all control sensors and test ports.
 - 6. Seasonal start-up and shutdown procedures.
 - 7. Control schematics and computer graphics for all control systems including those noted in item 4.
 - 8. Complete terminal interface procedures and capabilities for all control systems including those noted in item 4.
 - 9. A list of recommended operational recordkeeping procedures including sample forms, trend logs, or others, and a rationale for each
 - 10. Maintenance procedures for all building systems.

1.7 COMMISSIONING AUTHORITY

- A. The information provided herein regarding the Commissioning Authority's (CxA) responsibilities is provided to the Contractor for information only and is not a part of the work scope. The CxA is hired under direct contract with the Owner.
- B. The CxA for this project shall be Welsh Commissioning Group, Inc. (253) 856-3322, FAX (253) 859-2072 (www.wcxg.com).
- C. Responsibilities: The CxA responsibilities include, but are not limited to the following:
 - 1. Approve selection of the CCC.
 - 2. Participate in the initial on-site commissioning coordination meeting and subsequent commissioning meetings.
 - 3. Conduct site observations and provide site observation reports.

4. Review and approve the start-up plan and commissioning schedule as developed by the CCC and the Contractor.
5. Develop the commissioning plan including start-up plan, installation verification checklists and functional test documents
6. Review and approve various Contractor completed documents including CCLs, start-up documents and data sheets as they are completed.
7. Witness, spot check or otherwise verify successful completion of selected functional testing by Contractor.
8. Review the TAB report. Witness or spot check a sample of the systems to verify conformance to design and the report.
9. Prepare and submit final commissioning report with recommendation for system acceptance to the Owner. Report is developed with material provided by CCC and Contractor.

1.8 CONTRACTOR

A. Contractor Responsibilities

1. Support the commissioning process including integrating related commissioning activities into the construction process and schedule.
2. Assure the participation and cooperation of subcontractors as required to complete the commissioning process as outlined herein and the individual divisional commissioning specifications.
3. Assign a Commissioning Coordinator dedicated to the project.
4. Provide all submittal material as requested by the CxA and as required by the contract documents.
5. Attend commissioning meetings as scheduled.
6. Provide access to commissioned systems including ladders, lifts, scaffolding, access panels and other equipment as required.
7. Install and start-up equipment per the contract documents and start-up plan.
8. Conduct functional testing per the contract documents and commissioning plan
9. Provide required test instrumentation and equipment as needed to conduct functional testing per the commissioning plan.
10. Resolve issues as noted on the commissioning issues list and communicate resolution to the CxA.
11. Support seasonal testing as required.
12. Support the near-warranty-end review and correct any noted issues prior to warranty end.

1.9 CONTRACTOR'S COMMISSIONING COORDINATOR

A. Contractor's Commissioning Coordinator (CCC) Qualifications

1. The CCC shall be a regular employee of the Contractor assigned to the project. The CCC shall be responsible for coordination of Contractors responsible for commissioned system regardless of the Contractors they represent.
2. The CCC responsibilities shall not be shared by multiple parties, one individual shall be designated.
3. The individual designated as the CCC shall be available on site from the beginning of construction to final acceptance.

4. The individual designated as the CCC may have other construction or project related assignments, but only to the extent that they will be able to fulfil the CCC responsibilities outlined herein.
5. The individual designated as the CCC shall be identified by the Contractor during the submittal process.
6. Submit the name, company, contact information (address, phone, cell phone, FAX and e-mail) and other project duties for the proposed CCC.

B. Contractor's Commissioning Coordinator Responsibilities

1. Overall management and coordination of the commissioning work performed by the Contractors responsible for commissioned systems including responsibilities identified as the CCC's responsibility in each section on commissioned systems.
2. Coordinate Owner and CxA participation in scheduled commissioning activities. Notify Owner and CxA a minimum of 5 working days in advance of commissioning activities.
3. Collect, review and submit commissioning material and documentation to the CxA for approval prior to proceeding with commissioning activities including, but not limited to, the following:
 - a. Review and comment on preliminary functional tests provided by CxA. Contractors responsible for the systems to be commissioned shall also review this information.
 - b. Develop, manage and update commissioning schedule with commissioning activities
 - c. Proposed Manufacturer's installation and start-up documents
 - d. Proposed cleaning, flushing, testing, disinfection forms
 - e. Proposed Static tests and calibration forms
 - f. Start-up plan
 - g. Proposed functional performance test forms
 - h. Completed Manufacturer's installation and start-up documents
 - i. Completed cleaning, flushing, pressure testing, disinfection forms
 - j. Completed static tests and calibration forms
 - k. Completed Contractor Checklists
 - l. Completed functional performance test forms
 - m. TAB agenda
 - n. TAB preliminary and final report
 - o. Signed off issues lists
 - p. Proposed O&M Manuals
 - q. Training plans and agenda
 - r. Final O&M Manuals
 - s. Contractor Closeout Checklists
4. Develop, manage and update commissioning schedule. Integrate commissioning activities into master schedule. Provide a 2-week look-ahead schedule of commissioning activities, updated weekly or as scheduled commissioning activities change during 2-week period.
5. Distribute issues lists to Contractors responsible for the commissioned systems.
6. Assemble, manage and update the start-up plan.
7. Attend regularly scheduled construction and Owner's meetings and review commissioning activities with Contractors responsible for the commissioned systems and design team. Include commissioning activity items in construction meeting minutes.

8. Participate in and lead commissioning meetings as necessary to coordinate contractor activities in the commissioning process. Meetings are generally to be scheduled once every two weeks during initial construction of commissioned systems, and weekly during start-up and functional test phases. The CxA shall lead commissioning meetings when on site and the CCC shall lead all other meetings.
9. Provide material for, participate in the development of, and review the final report.
10. Coordinate and participate in seasonal testing.

1.10 BACK-CHARGING

- A. The Contractor and CCC are responsible to schedule and coordinate installation, start-up and testing activities with the CxA as specified herein and in each section on commissioned systems. Scheduled installation, start-up or testing activities that are not executed because of lack of preparation or coordination by the Contractor that result in unnecessary trips by the CxA are subject to back-charges to the Contractor.
- B. Functional testing shall be performed on the systems that are fully complete as reported by the Contractor. Systems that are reprogrammed or have had a software upload that can be shown to invalidate completed functional testing shall be retested to demonstrate proper operation. Tests re-conducted by the Contractor shall be performed at no additional cost to the contract. Tests re-conducted by the CxA shall result in a back-charge to the Contractor.
- C. The Contractor shall reimburse the Owner for costs associated with any additional efforts required to witness installation, start-ups, testing activities or for excessive back-checking as indicated above. These costs shall include salary, travel costs and per diem lodging costs (where applicable) for the Commissioning Authority. Rates to be used are listed below:

Per Diem Meals and Lodging:	\$150.00/Day (billed at cost)
Salary:	\$125.00/Hour

PART 2 – PRODUCTS

2.1 DOCUMENTATION

- A. Schedule-A (located at the end of each section on commissioned systems, XX-08-00) contains sample versions of the Contractor Checklists (CCL) to be used for the systems to be commissioned.
- B. Schedule-B (located at the end of each section on commissioned systems, XX-08-00) contains a Functional Performance Test Summary Table that outlines each functional test to be conducted for the systems to be commissioned. Part 4 of each section on commissioned systems contain sample versions of functional performance test procedures and data sheets. These do not represent all functional tests that will be required and are intended only to demonstrate the rigor of functional testing required.
- C. Paragraph 3.12 contains preliminary versions of the Contractor Closeout Checklists to be used for the systems to be commissioned.

2.2 INSTALLATION VERIFICATION

- A. The CxA shall conduct an independent Installation Verification using checklists based on the Contractor Checklists provided in Schedule – A, located at the end of each section on commissioned systems.

2.3 STARTUP FORMS

- A. Any installation and start-up checklists that are provided by the manufacturer shall be used in the equipment start-up process. Non-manufacturer developed forms must be approved by the CxA prior to use. Start-up forms must be submitted to the CCC for inclusion in the Start-up plan at least one month prior to system start-up to allow for review and approval by the CxA. Documentation for static testing, cleaning, flushing, calibration and other activities required by project documents are considered start-up forms. Schedule – A (located at the end of each section on commissioned systems) outlines the required documents to be submitted by the Contractor.

2.4 FUNCTIONAL PERFORMANCE TEST FORMS

- A. The functional performance test procedures and data sheets shall be developed by the CxA as outlined in Schedule B (located at the end of each section on commissioned systems), with input from the CCC and Contractor as required.
- B. The Contractor has specific responsibilities for developing, performing and documenting functional test procedures as directed by the CxA. See Schedule – B for minimum testing and documentation requirements.
- C. In addition to the testing outlined in Schedule – B, wherever the Project Documents require testing, test reports, checklists, verifying operation, demonstrating proper operation or other similar language with respect to the systems to be commissioned, written testing procedures and documentation of tests will be required from the Contractor, whether specified or not in the commissioning sections.
- D. A tracking document for these submittals is included in Schedule - B which outlines which of these activities will require submittal information by the Contractor. Contractors responsible for the systems to be commissioned and due dates will be determined at the initial commissioning coordination meeting.

2.5 COMMISSIONING ISSUES LIST

- A. The CxA shall maintain the Commissioning Issues List. At any time an issue is discovered where the installation or performance of the commissioned system does not meet contract document requirements, an individual issue shall be generated. As issues are resolved and verified by additional inspections or tests, the issues list shall be updated. The issues list shall be a running history of the status of the issue.

2.6 TEST EQUIPMENT

- A. Where required, the Contractor shall provide test equipment, whether specified or not, to execute the functional performance tests.

- B. The test equipment shall be provided in sufficient quantities to execute functional testing in an expedient fashion.
- C. The test equipment shall be of industrial quality and suitable for testing and calibration with accuracy within the tolerances necessary to demonstrate system performance.
- D. Equipment shall be certified to an accuracy of 10% of the smallest tolerance to be measured. For example, if a temperature gage is required to be +2 degrees F, the calibration device must have an accuracy of +0.2 degrees F.
- E. The test equipment shall have calibration certification per equipment manufacturer's interval level or within one year if not specified.

PART 3 – EXECUTION

3.1 DOCUMENTATION

- A. Checklists, start-up documentation, test forms and other commissioning related documentation required by contract shall be neatly and legibly completed and provided to the CxA via the CCC in a clear and easily readable condition.
- B. Required checklists, start-up documentation, test forms and other commissioning related documentation shall be provided to the CxA via the CCC in a timely fashion and according to the commissioning and construction schedule.
- C. In every case where the Contractor is unable to comply with an item as listed on the checklist or form, the Contractor shall immediately notify the CxA in writing as to the reasons for non-compliance.

3.2 ACCESS TO EQUIPMENT AND SYSTEMS

- A. The Contractor shall provide access to all equipment and systems to be commissioned both during construction and after occupancy as necessary. The Contractor shall coordinate with other trades to assure that access to commissioned equipment is available to the CxA and other trades at the proper times and with sufficient duration.
- B. The Contractor shall provide all ladders, lifts, scaffolding, access doors, removal/installation of ceiling tiles and any other materials or activities as necessary to allow the CxA to easily access equipment and systems.
- C. During the commissioning process, the Contractor shall coordinate the installation of ceiling tiles and other finishes to allow all trades and the CxA to perform their work without having to remove or reinstall ceiling tiles or other finished work. Note that above-ceiling access is required to perform Installation Verification and Functional Performance Testing of systems. Ceiling tiles typically must be in place during Testing and Balancing activities. Since Testing and Balancing may occur between Installation Verification and Functional Performance Testing, some ceiling tiles may require multiple removal/reinstallation cycles.

- D. In the event that system commissioning is not fully completed after occupancy, the Contractor shall be responsible for coordinating with the owner for access to the equipment or system for testing, back-checking and other commissioning activities. This requirement shall include providing access to equipment as indicated above.

3.3 MEETINGS AND SITE OBSERVATIONS

- A. Commissioning status meetings shall be scheduled to occur during the construction and closeout phase to monitor progress and to help facilitate the commissioning process. Contractor representatives for commissioned systems shall be required to attend these meetings. Meetings will generally be scheduled to occur with scheduled construction or management meetings. The CCC shall schedule, coordinate and lead the meetings including providing meeting minutes. These meetings can coincide with, or be a subset of, the normal subcontractor meetings. When the CxA is on site for commissioning duties or scheduled meetings, the CxA shall lead the commissioning meetings and prepare and distribute minutes.
- B. Commissioning shall be included in the general construction and Owner's meetings. The CCC will attend these meetings and discuss commissioning related topics there. Commissioning information and issues shall be documented in the meeting minutes.
- C. The CxA may perform periodic site visits during construction to monitor commissioning activities. The purpose of these observations will be to evaluate compliance to contractual obligations such as cleanliness, capping ductwork, access to equipment, maintainability and so forth to identify concerns before they are repeated throughout the project. Any issues identified will be noted on a Site Observation Report. The Contractor shall review these reports and take action to resolve issues as needed and deemed appropriate in consultation with the Owner, CxA, and Design Team..

3.4 CONTROLS INTEGRATION MEETING – BUILDING AUTOMATION AND LIGHTING

- A. The controls integration meetings (CIM) shall be conducted after the building automation and lighting controls submittals are complete and the CxA has reviewed the submittals. The meetings are to be conducted prior to finalizing the functional test procedures and shall be attended by the CxA, the BAS control contractor, the VRF control contractor, the lighting controls contractor, the mechanical/electrical engineers and a representative of the Owner's maintenance group at a minimum. The CIM shall include, but not be limited to, the following topics:
 - 1. Sequence of Operations
 - 2. Alarm Points List
 - 3. Trend Points List
 - 4. Displayed/Adjustable Point List
 - 5. Graphical Interface
 - 6. Integration with packaged equipment
 - 7. Lighting control interface
 - 8. Point-to-Point Checkout and Commissioning of Existing Equipment
 - 9. Method of Conducting Cx Functional Testing

3.5 PRE-STARTUP ACTIVITIES

- A. The CxA shall develop a preliminary commissioning plan with input from the Contractors via the CCC.
- B. As soon as possible after the bid award, approval of submittals and development of the preliminary commissioning plan, the CxA shall conduct an initial commissioning coordination meeting with the CxA, CCC, Contractors, Owner's Representative and the A/E Team. The CxA will explain the commissioning process in detail, and identify specific commissioning related responsibilities. The preliminary commissioning plan shall be provided to the Contractors at this time. The requirements for submittal material shall be reviewed along with a preliminary schedule of commissioning activities.
- C. The Contractor shall submit to the CxA via the CCC preliminary O&M manuals prior to developing the Start-up and Commissioning Plan by the CxA.
- D. The Contractor shall submit to the CCC the proposed start-up and Contractor required testing documentation for assembly into the Start-up and Commissioning Plan by the CxA.
- E. The CxA shall develop a Start-up Plan based on Contractor submittals and the start-up requirements of the contract documents. It details the procedures and forms for individual pieces of equipment and systems that have start-up and testing requirements. It shall be a three-ring binder indexed by system or equipment. The binder shall be populated with procedures and blank forms and used to file the completed forms as the procedures are completed by the Contractor. The Start-up Plan shall include, but is not limited to, the following:
 1. List of commissioning team members.
 2. Start-up document tracking forms.
 3. Master list of equipment/systems for installation and start-up.
 4. Start-up and static testing schedule.
 5. Manufacturer and Project Document required installation, start-up and testing procedures
 6. Blank copies of start-up and testing forms for each type of equipment/system.
 7. Contractor checklists for each system.
- F. The CxA shall develop the final commissioning plan. The commissioning plan typically includes, but is not limited to, the following:
 1. Project overview.
 2. Commissioning Authority scope of work.
 3. Contractor's Commissioning Coordinator scope of work.
 4. Roles and responsibilities of commissioning participants.
 5. A schedule with sequential description of commissioning activities.
 6. A complete list and description of equipment and systems to be commissioned.
 7. The Start-up Plan
 8. Installation verification data forms for systems and equipment to be commissioned.
 9. Functional performance test criteria, test forms and data forms for systems and equipment designated to be functionally tested including trending needed for the performance period.
 10. System integration testing plan.
 11. Sample commissioning issues list.

12. Project closeout activities

- G. The Contractor shall be responsible for the liability and safety of conducting tests. The CCC and Contractor shall review the Functional Performance Test (FPT) documents provided by the CxA prior to including them in the final commissioning plan. The Contractor is to review preliminary and final test procedures to verify that they:
1. Will not pose a risk of injury to any personnel.
 2. Will not pose a risk of damage to equipment, structure or any physical element of the building.
 3. Will not negate any equipment or system warranties.
 4. Are executable with the personnel and equipment available to the Contractor.

3.6 EQUIPMENT INSTALLATION AND START-UP

- A. Installation and Start-up activities include procedures outlined by the contract documents and the equipment manufacturer including cleaning, static testing, calibration and other related activities. The CxA shall provide the Contractor with a start-up plan based on Contractor submitted procedures and checklists.
- B. The CxA may witness selected equipment start-up and testing performed during construction. The CCC shall keep the CxA informed of commissioning activities with regular status reports and updates to the commissioning plan, start-up plan and schedules
- C. The Contractor shall perform equipment start-up per the approved start-up plan and start-up forms. The Contractor shall correct issues as they are discovered. The Contractor shall complete the installation and start-up forms as the work is complete and place the fully completed installation and start-up forms in the start-up binder.
- D. Upon completing the start-up activities for a given system, the associated Contractor Checklists (CCL) shall be completed by the Contractor and placed in the appropriate tab section of the start-up binder. The CCL is used as a cover form for the individual equipment manufacturer's recommended start-up forms for each system. The completed CCL is the Contractor's certification that they have completed all required installation and start-up activities and the system is ready for installation verification by the CxA and subsequent functional performance testing.
- E. The start-up binder shall be maintained by the Contractor's Commissioning Coordinator. The Contractor is responsible for maintaining the start-up book in good order and to turn the completed document over to the CxA at the conclusion of start-up. If the start-up binder is lost or stolen, it shall be the responsibility of the Contractor to recreate the binder and its contents, including re-conducting start-up activities if necessary.
- F. Upon completion of all start-up activities including the required documentation, the Contractor shall submit the start-up binder to the CxA via the CCC for review and approval.

3.7 INSTALLATION VERIFICATION (IV)

- A. The IV process shall begin when signed off CCLs and start-up documents are received from the Contractor.

- B. The CxA shall conduct an independent installation verification audit on selected systems to verify conformance with manufacturer's installation instructions and project documents. The CxA shall use the completed CCL from the contractor to verify installation. Discrepancies discovered will be reported on the Commissioning Issues List by the CxA. A copy of the issues list will be transmitted to the Contractor via the CCC with a copy to the Owner and Design Team.
- C. The Contractor shall correct any issues discovered and note the action taken on the issues log and return it to the CxA via the CCC.
- D. The CxA shall back-check and verify that the issues are resolved prior to proceeding with FPT.

3.8 FUNCTIONAL PERFORMANCE TESTS (FPT)

- A. FPT includes the documented testing of system parameters, under actual or simulated operating conditions. Final performance testing of systems will begin only after the Contractor certifies that systems are 100% complete and ready for functional testing, by providing completed and signed-off copies of the start-up plan and providing completed Contractor Checklists.
- B. Any testing procedures and forms which the Contractor is required to provide must be provided by the CCC to the CxA at least one month prior to start of installation of the equipment and as needed to complete the commissioning plan.
- C. Functional performance testing of commissioned systems shall begin after all critical issues discovered during the start-up and installation verification process have been corrected. The CxA and Contractor shall conduct functional performance tests on selected systems to verify functional performance criteria as outlined in Schedule - B (located at the end of the individual divisional commissioning specifications) and as required in the Project Documents and approved by the CxA in the Commissioning Plan. Discrepancies discovered will be reported on the Commissioning Issues List by the CxA. A copy of the issues list will be transmitted to the Contractor via the CCC.
- D. Functional tests that have excess failure rates or are aborted due to lack of Contractor participation or scheduling are subject to the back-charging provisions of the paragraph Back Charging.
- E. The Contractor shall make available to the CxA a method of interfacing with any commissioned control systems at the building site including but not limited to the building automation system, packaged control systems, programmable logic controllers and lighting control systems. This interface shall be made available regardless of whether or not a permanent local work station is specified elsewhere in the contract documents. The on-site interface shall be made available from the time of completion of start-up activities until trending is complete and all commissioned systems are accepted by the owner. The Contractor shall also make available to the CxA a method of remote access to the control system(s) beginning at the time of completion of start-up activities and extending for one year after system acceptance. Remote and local access shall include all software, licensing, software keys and anything else required to facilitate full access to the system(s). The local and remote interfaces shall include all contract required interfaces including, but not limited to, all graphics, trends and alarms. The CxA shall be given an account with full security access privileges to the system(s).

3.9 COMMISSIONING ISSUE DOCUMENTATION AND CORRECTION

- A. The commissioning issues list is generated and maintained by the CxA to include a description of the issue, date of posting, the current status of issues, assignment to the responsible party and the date of final resolution as confirmed by the CxA. Items listed may include issues where design, products, execution or performance does not appear to satisfy the Contract Documents and the design intent. The resolution of issues identified on this list may or may not be the responsibility of the Contractor.
- B. Once issues have been identified and assigned to a Contractor on the Commissioning Issues List, the Contractor shall be required to investigate and resolve these issues in a timely manner. After correcting issues noted on the Commissioning Issues List, the Contractor shall sign off on each issue and return the list to the CxA via the CCC for initiation of back-checking by the CxA.
- C. In the event that an issue has been assigned to the wrong Contractor or resolution of the issue requires multiple trades, Contractor with the initial assignment shall take the lead in working with the CCC and CxA to reassign the issue or coordinating the multiple trades to resolve the issue.
- D. The CxA shall back-check and verify that the commissioning issues are resolved and update the issues list. Excessive back-checking by the CxA due to issues reported as complete not actually being resolved are subject to the back-charging provisions of the paragraph Back Charging.

3.10 PERFORMANCE PERIOD

- A. Performance Period: The performance period is a set length of time designated to demonstrate proper facility operation prior to acceptance. The performance period commences after successful completion of all functional testing. Parameters evaluated for heating and ventilation systems typically include zone temperature stability, optimum start/stop, warm-up period and other related functions. For lighting control the parameters include lighting levels, occupancy switching and daylight control. As part of this process the Contractor will be required to set up and provide trends of building automation system parameters per the direction of the CxA. The specific trending needed will be outlined in the commissioning plan, the Contractor should assume that all points in the building automation system will be trended. Lighting control parameters will be trended if system capabilities exist, otherwise the Contractor will provide stand-alone data loggers to demonstrate operation of systems.
- B. The CxA shall prepare a performance period test plan including measured variables and success criteria based on performance characteristics described in the Project Documents. The CxA will provide the Contractor with a list of trend log definitions or stand-alone data logger requirements based on the performance period test plan included in the Commissioning Plan.
- C. The Contractor will review the performance period test plan and set up the trend log definitions and stand-alone data loggers. Trend logs shall be set up for all inputs/outputs, both digital and analog, for all points in the system both physical and virtual. Trend interval shall be 5 minutes unless otherwise directed by the CxA. The minimum trend period shall be 14 days. Trend log point headings as displayed on system graphs and data tables shall be adequately descriptive for the point but no longer than 12 characters unless approved by the CxA. System default names are not acceptable. The heading titles shall contain no extraneous characters that are not needed to describe the point. The contractor shall provide the trends to the Commissioning Authority in

electronic format, in MS Excel or a comma delimited file with related system parameters grouped together for easy comparison. If building automation system resident memory is limited or there are other issues with the trending requirements, the Contractor will work with the CxA to redefine the test plan.

- D. The performance period will commence within one week of the final functional tests and run for a minimum of 14 days. A similar performance period may be required for seasonal testing. If failures are encountered, the performance period shall be aborted. After corrections are made, the performance period shall be re-started at day one. Systems shall run per the final sequences of operation for 30 days without adjustments or corrections before the warranty period will commence.

3.11 SEASONAL TESTING

- A. Seasonal testing is required to demonstrate the system's ability to meet design conditions associated with seasonal extremes, typically peak heating and peak cooling conditions.
- B. Seasonal testing may also be required when ambient conditions will not support the operation of specific equipment.
- C. Seasonal testing is required to demonstrate the performance for a fully occupied building or portion of the building as well as for systems that are occupancy sensitive.
- D. The Contractor shall provide labor and material for seasonal testing and make corrections to any Contractor related issues discovered.

3.12 PROJECT CLOSEOUT

- A. Post construction Contractor responsibilities include completion and submission of the Project Closeout Checklist for each commissioned system to the CxA for verification of completing contracted obligations for the owner. Sample project closeout requirements, tracking sheet and checklists are included herein. The Contractor is free to submit alternate formats for review and approval by the Owner, Design Team and CxA as appropriate.
- B. Upon request, the Contractor is responsible for providing the CxA with copies of the balancing reports, as-built drawings, O&M manuals relevant to the systems commissioned and the Contractor provided material required for the Systems Manual. The CxA shall review this material for compliance with Project Documents and report issues for resolution by the responsible party.
- C. Upon completion of commissioning activities the CxA will prepare and submit to the owner the Final Commissioning Report detailing the commissioning plan and commissioning activities and recommending acceptance to the Owner. The CCC will support this effort by coordinating the Contractor provided documentation.
- D. Training on related systems and equipment operation and maintenance shall only be scheduled to commence after functional testing is satisfactorily completed, O&M manuals have been delivered and approved, the Systems Manual is complete and systems are verified to be 100% complete and functional. Each Contractor is responsible to provide a topical outline of the subjects to be covered in the training session(s), the expected length of time for the training sessions, and a brief resume

listing the qualifications of the proposed training presenters. The CCC is responsible for developing the training plan with input from the Contractor and directing any video taping efforts. The training plan is to be submitted to the Owner, Design Team and CxA for approval prior to conducting training. The CCC is responsible for coordinating training with the Owner and CxA and to verify execution of the training plan.

- E. Contractor Project Closeout Checklists are included in this section. The Contractor responsible for the delivery of each of the listed systems in the Project Closeout System Summary Table below shall be responsible for completion of a Project Closeout Checklist for that system. The checklists included within this Schedule are sample versions and are only representative of what shall be included in the final Commissioning Plan. The Contractor is responsible to demonstrate compliance with all closeout requirements and the final checklists may contain additional requirements to document this compliance. In no case shall the checklists require performance criteria more stringent than specified by the Project Documents except as noted below regarding developing training plans.
- F. Training Plans: For all Owner instruction, the Contractor shall submit a training plan for each system identified in the Project Closeout System Summary Table below, for review and approval by the Commissioning Authority and the Owner. Training shall not proceed without approval of the training plan. A sample training plan is included following the sample Project Closeout Checklist. The training plan must contain the following as a minimum:
 - 1. Attendee sign-off sheet.
 - 2. Required training hours specified in the project documents.
 - 3. Detailed list of subject to be covered and durations.
 - 4. Qualifications of training provider.
 - 5. Training schedule including duration of each training session.

Project Closeout System Summary Table

A	B	C	D	E	F	G	H	I
System Description	Responsible Contractor	Proposed Agenda Received	OK	Training Performed	OK	Closeout Form Received	OK	Notes
Division 11 Systems								
Walk-in Freezers and Coolers								
Division 20 Systems								
Balancing Air and Water								
Division 21 Systems								
Fire-Suppression Systems								
Division 22 Systems								
Hot Water Heaters/Pumps								
Division 23 Systems								
Dedicated Outdoor Air Units								
VRFZ System								
Split System AC								
Make up air unit								
Kitchen exhaust								
Unit heaters								
Paddle fans								
Air Distribution System								
VRFZ Control System								
Division 25 Systems								
Energy Management and Control System								

A	B	C	D	E	F	G	H	I
Division 26 Systems								
Daylight Dimming/Switching								
Occupancy Sensors								
Lighting Control System								
Division 28 Systems								
Fire Alarm								

Summary Table Key:

- A. System description for each system commissioned.
- B. Contractor responsible for providing project closeout and training. To be filled in after contract award.
- C. Date the proposed training agenda is received from the responsible Contractor.
- D. Indicates that the CxA and Owner has received and approved the proposed training agenda.
- E. Date the training was performed.
- F. Indicates that CxA and Owner has approved the training provided.
- G. Date the completed Contractor Closeout Checklists are received from the responsible Contractor.
- H. Indicates that the CxA has approved completed Contractor Closeout Checklists.
- I. Notes on status of forms, irregularities and rework needed.

SAMPLE DOCUMENT - Contractor Closeout Checklist

System: _____

Instructions:

Contractor shall complete all specified items as listed on the following checklist and return the signed checklist to the Commissioning Authority via the Contractor Commissioning Coordinator prior to substantial completion. In addition, the Contractor may be required to demonstrate compliance with specified criteria on-site, as deemed appropriate by the Commissioning Coordinator or Commissioning Authority.

Project Closeout Checklist:

Instruction:

- Owner instruction is complete per project documents.

Warranty and Spares:

- Warranty has been provided with operations and maintenance manuals.
- All spares have been submitted to owner and receipt of materials signed.

Documentation:

- O&M Manuals are complete and submitted.
- As-built drawings, material list, technical literature, list of recommend spare parts, system description, and sequence of operation have been updated and included in the O&M manuals.

Final Acceptance:

- Final performance testing completed and system accepted by owner, CC and CxA.

Please note: This checklist is not intended to represent all the requirements of the Project Documents within this section. Completion of the items on this checklist does not release the Contractor from their contractual obligation to complete all the work as detailed within the entire specification section.

Sign-Off:

Team Member	Print Name/Co.	Initial	Date
Installing Contractor:			
General Contractor CC:			

SAMPLE DOCUMENT - Operation and Maintenance Training Agenda

Equipment / System: _____

SECTION 1 Filled out by the project Owner, submit to contractor

SECTION 2 Contractor to indicate Trainer and credentials

SECTION 3 Contractor to indicate proposed Agenda and Topics.

SECTION 1 – Audience and General Scope

Description	Check all that applies
Intended Audience	
Facility Manager	
Facility Engineer	
Facility Technician	
Project Manager	
Tenant	
Other	
General Objectives and scope of training	
Provide an overview of the purpose and operation of equipment, including required interactions with trainees.	
Provide technical information regarding the purpose, operation and maintenance of equipment at an intermediate level expecting that some support from outside contractors will be provided as needed.	
Provide technical information regarding the purpose, operation, troubleshooting and maintenance of equipment at a detailed level expecting that most operational and maintenance, service and repair will be conducted by trainees.	

Use blank spaces to describe additional/other objectives for the training session as needed.

SECTION 2 – Credentials - Trainers/Instructors & Photographer

Company	Trainer/Photographer	Position/Qualifications

SECTION 3 – Agenda and Training Topics

Description	Indicate covered items	Duration (min.)	Trainer	Complete
General purpose of the equipment/system (design intent).				
Review of drawings and schematics.				
Review start-up, loading, operation, unloading, shut-down, occupied/unoccupied operation, seasonal change-over procedures as applicable.				
Review building automation control interface, set points, schedules, alarms, graphical interface as applicable.				
Review unitary (packaged) controls, programming, troubleshooting, alarms, and manual operation procedures as applicable.				
System interface with other systems – fire alarm, emergency power system, and other systems as applicable.				
Energy conservation strategies as applicable.				
System/equipment troubleshooting methods, procedures, error messages as applicable.				
Service, maintenance, preventive maintenance procedures.				
Spare parts provided and suggested.				
Special requirements to maintain warranty.				
Special procedures related to tenant interface with the system.				
Health and/or safety issues as applicable.				
Use of O&M manuals.				
Use of as-built drawings, plans and/or schematics.				
Discussion/lecture.				
Site demonstration of equipment operation.				
Written handouts.				
Manufacturer training manuals.				
Video presentation.				
Question and answer session.				
Training session to be taped for owner’s future reference and training requirements.				

Use blank spaces to fill in any additional/other subjects covered.

3.13 NEAR-WARRANTY-END REVIEW

- A. Approximately two months prior to the end of warranty on commissioned systems, the Contractor shall participate in a review of the commissioned systems with the owner, design team and the CxA to identify any operational and outstanding issues. For this review, the Contractor shall schedule the attendance of appropriate parties with project specific knowledge, including but not limited to the following:

General Contractor
Mechanical Contractor
Building Management System Contractor
Variable Refrigerant Flow System Startup and Controls Contractor(s)
Lighting Controls Contractor(s)

- B. The review shall consist of a meeting on site with the Contractor with follow up testing and verification by the Contractor.
- C. A list of issues will be developed by the owner and CxA. Once issues have been identified, the Contractor shall investigate, test and inspect systems as necessary to identify and resolve warranty issues in a timely manner.
- D. The Contractor shall ensure the cooperation of appropriate Contractors responsible for the commissioned systems in any follow-up meetings, testing, inspections and investigation regarding warranty issues and in resolving, prior to the end of the warranty, any warranty issues discovered.
- E. Issues identified in this review will remain warranty items until satisfactory completion, even if the warranty period expires during the review and correction period.

END OF SECTION 019113

SECTION 022200 - EXISTING SITE CONDITIONS

1.1 SUMMARY

- A. Section Includes: Information on topographic site survey.

1.2 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this section.
- B. Topographic Survey, dated August 22, 2016, by Axis Survey and Mapping, Inc.
- C. Field Report, dated November 2, 2017, by Associated Earth Sciences Incorporated, attached, regarding soil stockpile in parking lot P-5.
- D. Asarco testing to comply with Washington Department of Ecology's SEPA review; WSH has completed testing and results will be provided as soon as possible.

1.3 BIDDING REQUIREMENTS

- A. Contractor shall review the project site, the site conditions and the routes of travel to the site.

1.4 DISCLAIMER

- A. Survey is provided without warranty as to their accuracy or completeness and is intended only as a general reference to probable site conditions.
- B. No individual or entity shall be responsible for any interpretation or conclusions drawn by Bidder from information furnished.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 022200



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

FIELD REPORT

911 Fifth Avenue
Kirkland, Washington 98033
Phone: 425-827-7701
Fax: 425- 827-5424
www.aesgeo.com

Date 11/2/2017	Project Name Western State Hospital	Project No. 040805E001
Location 9601 Steilacoom Blvd. SW		Municipality Lakewood
Permit No.	DPD No.	Weather Cloudy 55°F
Report No. 1		
Engineer/Architect Coughlin Porter Lundeen / NAC Architecture		
Client NAC Architecture		
General Contractor/Superintendent N/A		
Grading Contractor/Superintendent N/A		

TO: NAC Architecture
2025 1st Avenue, Suite 300
Seattle, WA 98121

ATTN: Cheryl Jacobs

AS REQUESTED BY: Cheryl Jacobs

THE FOLLOWING WAS NOTED:

Stockpile

Associated Earth Sciences, Inc. (AESI) arrived onsite in the am to observe a stockpile of soil located at the northwest corner of the hospital campus in a parking lot near the intersection of West Street and Sentinel Drive. The stockpile is at the northwest corner of the parking lot and was not covered. We understand that the stockpile was generated from the grading of another parking area somewhere on the hospital campus. The soil generally consisted of brown to dark brown, sandy gravel with trace silt. The stockpile was approximately 6.5 feet high with a flat top and approximately 120 feet long. With a shovel and a few five-gallon buckets AESI took several samples of the stockpile from different locations in order to get representative samples. The samples were taken back to our laboratory for two sieve analyses and two proctor test.

Based on our visual observations and laboratory testing the stockpiled soils are suitable for use as structural fill, in our opinion. The results of our sieve analyses show that the fine-grained content, material passing the #200 sieve, of the soil ranges from 9.5 to 10.4 percent and therefore, the material is moderately moisture sensitive and can become too wet to achieve proper compaction if exposed to weather. We recommend that the stockpile is covered with plastic which is anchored down by sandbags.

Note: Environmental testing was beyond our scope of work. Our opinion is strictly based from a geotechnical standpoint.

Attachments: Laboratory Results

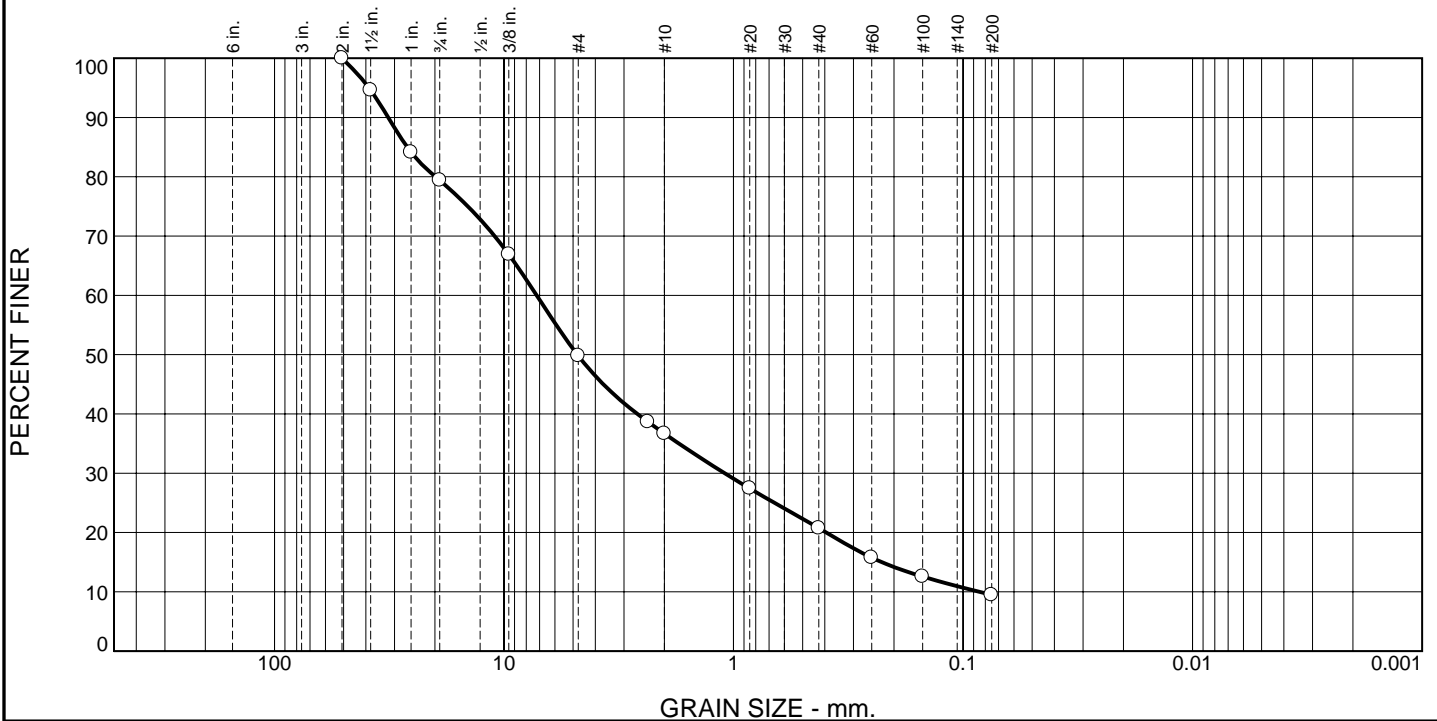
Copies To: _____

Field Rep: Tony Romanick, P.E.

Date Mailed: _____

Principal / PM: Kurt Merriman, P.E. / Tony Romanick, P.E. TR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.6	29.6	13.1	16.0	11.2	9.5	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	94.6		
1	84.1		
.75	79.4		
.375	66.9		
#4	49.8		
#8	38.7		
#10	36.7		
#20	27.4		
#40	20.7		
#60	15.8		
#100	12.6		
#200	9.5		

* (no specification provided)

Material Description

very sandy, GRAVEL, some silt

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= GW-GM AASHTO (M 145)= A-1-a

Coefficients

D₉₀= 31.9426 D₈₅= 26.4114 D₆₀= 7.2038
D₅₀= 4.7909 D₃₀= 1.0936 D₁₅= 0.2261
D₁₀= 0.0851 C_u= 84.69 C_c= 1.95

Remarks

Collected by: TR

Date Received: 11-3-2017 Date Tested: 11-8-2017

Tested By: BN

Checked By: TR

Title: _____

Location: Onsite- east end of parking lot stockpile

Date Sampled: 11-3-2017

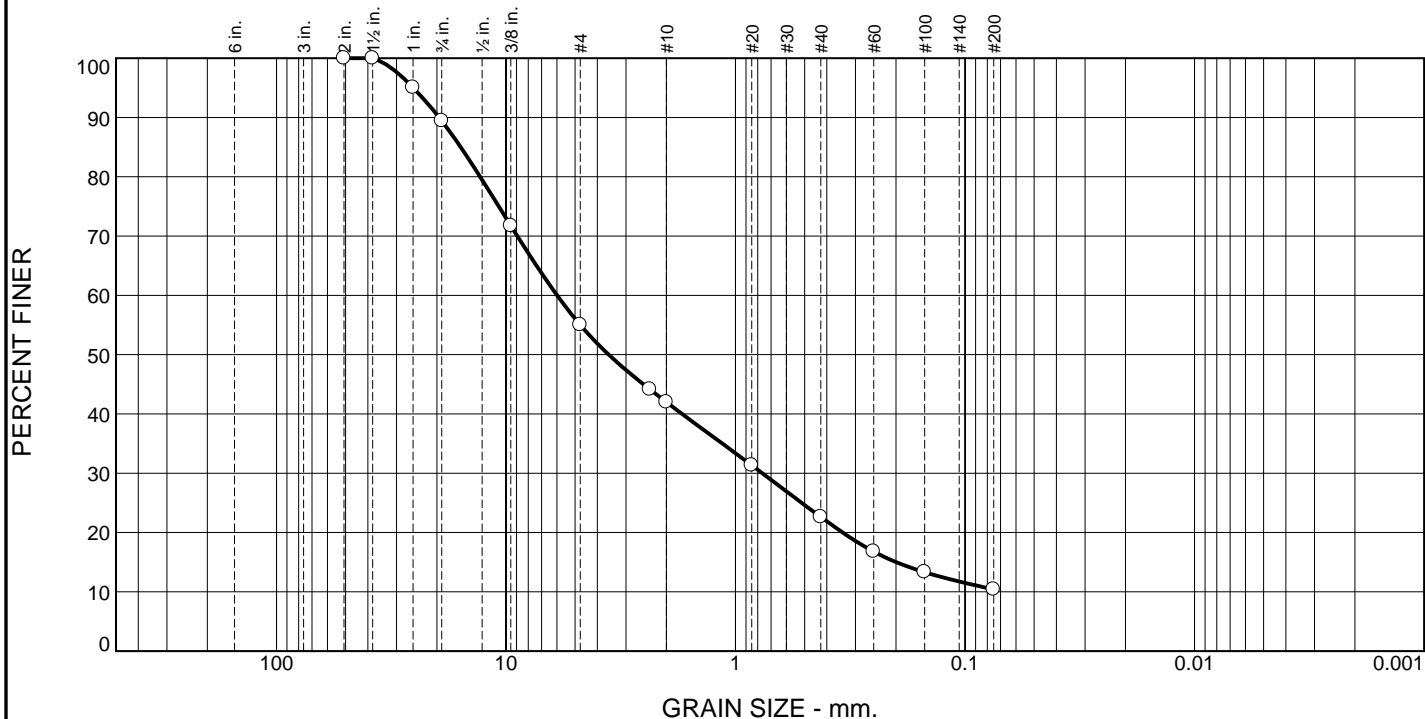


a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Client: NAC Architecture
Project: Western State Hospital
Project No: 040805 E001

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.6	34.4	13.0	19.4	12.2	10.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	95.0		
.75	89.4		
.375	71.7		
#4	55.0		
#8	44.1		
#10	42.0		
#20	31.3		
#40	22.6		
#60	16.8		
#100	13.3		
#200	10.4		

* (no specification provided)

Material Description

very sandy, GRAVEL, some silt

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= GP-GM AASHTO (M 145)= A-1-a

Coefficients

D₉₀= 19.5512 D₈₅= 15.7503 D₆₀= 5.9883
D₅₀= 3.5700 D₃₀= 0.7640 D₁₅= 0.1995
D₁₀= C_u= C_c=

Remarks

Collected by: TR

Date Received: 11-3-2017 Date Tested: 11-8-2017

Tested By: BN

Checked By: TR

Title: _____

Location: Onsite- west end of parking lot stockpile

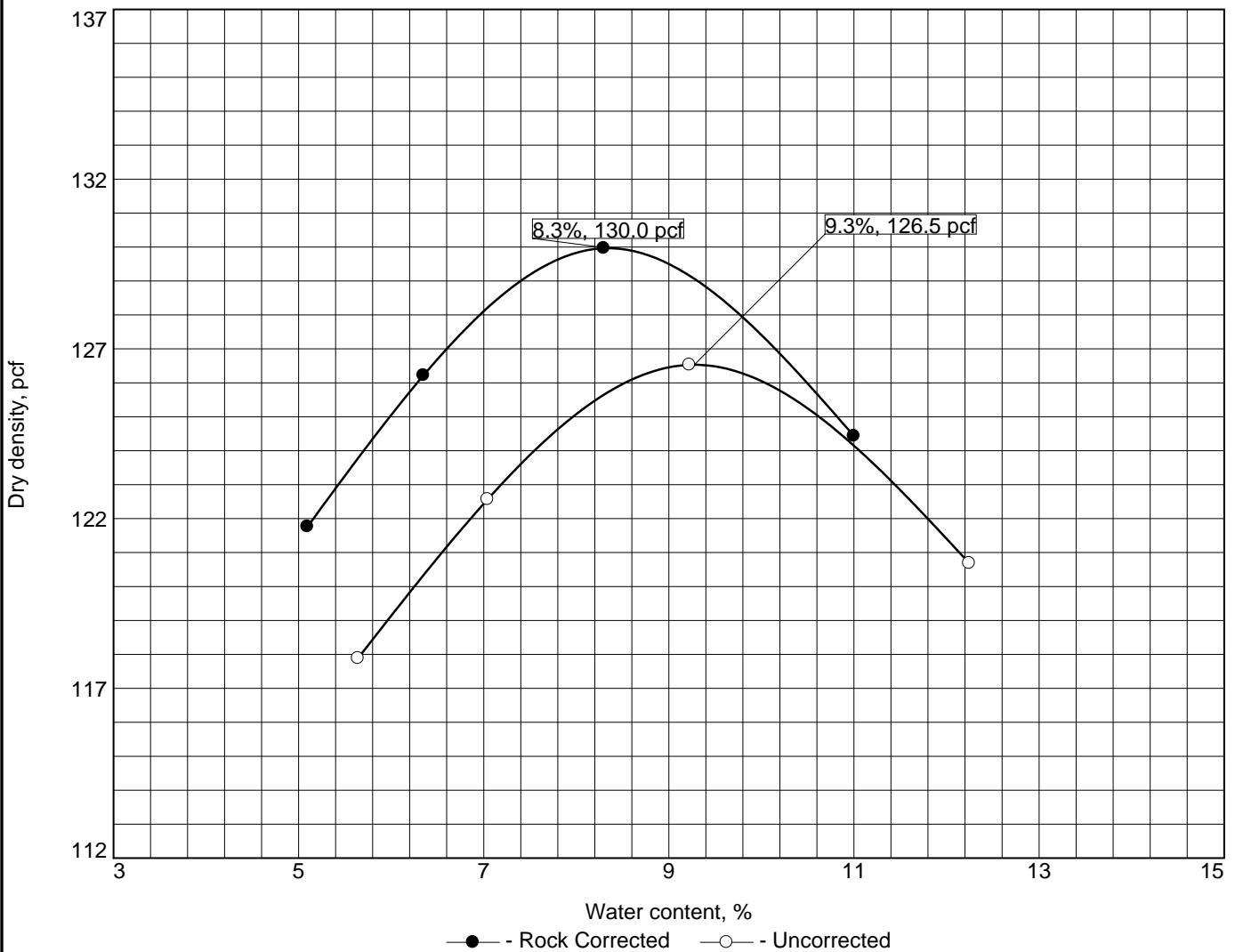
Date Sampled: 11-3-2017



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Client: NAC Architecture
Project: Western State Hospital
Project No: 040805 E001


Figure



Test specification: ASTM D 1557-91 Procedure C Modified
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	GP-GM	A-1-a			NV	NP	10.6	10.4

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 130.0 pcf	126.5 pcf	very sandy, GRAVEL, some silt
Optimum moisture = 8.3 %	9.3 %	

Project No. 040805 E001 Client: NAC Architecture Project: Western State Hospital Date: 11-7-2017 Location: Onsite- west end of parking lot stockpile	Remarks: Collected by: TR
 associated earth sciences incorporated	

Figure

Tested By: BN Checked By: TR

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures and finishes for the following:

1. Foundations and footings.
2. Slabs-on-grade.
3. Elevated slab on metal deck.
4. Retaining walls.
5. Access ramps and walkways.
6. Waterstops.

- B. Related Sections:

1. Division 01 "Sustainable Requirements."
2. Division 03 Section "Architectural Concrete Finishing" for finishing of exposed concrete slabs at selected areas.
3. Division 07 Section "Bituminous Dampproofing" for coatings on concrete surfaces below grade.
4. Division 07 Section "Sheet Waterproofing" for bentonite waterproofing at footings and foundation walls adjacent to occupied areas.
5. Division 07 Section "Water Repellents" for sealing typical concrete walls.
6. Division 07 Section "Thermal Insulation."
7. Division 07 Section "Below-Grade Vapor Retarders".
8. Division 07 Section "Joint Sealants" for sealing concrete joints.
9. Division 31 Section "Earthwork" for drainage (capillary break) fill under slabs on grade.
10. Division 32 Section "Concrete Paving" for concrete pavement and walks.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Refer to General Structural Notes for requirements.

- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Shop drawings for reinforcement detailing fabricating, bending and placing concrete reinforcement. Comply with ACI 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures” showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures. Show all wall elevations.
- D. Laboratory test reports for concrete materials and mix design test.
- E. Welding certificates. Welders shall be WABO or AWS certified.
- F. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Provide mix submittal highlighting the extent of fly ash replacement, including dollar value.
- B. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- C. Cut sheets or other documentation for each product/material highlighting recycled content information.
- D. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.6 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. American Concrete Institute (ACI) 301, “Specifications for Structural Concrete for Buildings.”
 - 2. ACI 318, “Building Code Requirements for Reinforced Concrete.”
 - 3. Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice.”
 - 4. ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”
- B. Concrete Testing Service: Comply with provisions of Division 01 Section “Quality Requirements” and Division 01 Section “Testing and Inspection Services”.

- C. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."
- D. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Coordination."
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORMING SYSTEM

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge sealed, with each piece bearing legible inspection trademark.
- B. Form for Unexposed Finish Concrete: Plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOC's) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade as indicated in "General Structural Notes" on drawings.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

- C. Fly Ash: ASTM C 618, Type F. 15-45% of the cement mix.
- D. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded, and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
- F. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.
- G. Water: ASTM C 94/C 94 M and potable.
- H. Concrete Strength: See General Structural Notes for required minimum strengths for structural concrete members. Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency for preparing and reporting proposed mix designs.
- I. Mixes shall be proportioned so as not to exceed the maximum slumps indicated.
- J. Water-Cementitious Material Ratio: See General Structural Notes.
- K. Shrinkage-Reducing Concrete: **Concrete mixes for members exposed upon their final condition** shall be proportioned such that the **slab drying shrinkage shall not exceed 0.03% at 90 days** (laboratory conditions). Submit strength and shrinkage test data and mix design to the architect and structural engineer for review a minimum of two weeks prior to placing any concrete.
 - 1. Water-Cement Ratio: 0.40 maximum
 - 2. Strength: Per General Structural Notes
 - 3. Aggregate: Gradation well proportioned and distributed with largest topsize coarse aggregate of ¾ inch.
 - 4. Fly Ash or Slag: Maximum 15%
 - 5. Testing: Trial mixtures tested for shrinkage reduction prior to construction
 - 6. Admixtures: See approved admixtures in section below.
- L. Admixtures:
 - 1. General: Provide concrete admixtures that contain not more than 0.05 percent chloride ions.
 - 2. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

- a. Use air-entraining admixture in exterior exposed concrete. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - b. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure: 5 to 7 percent air unless indicated otherwise in Structural Notes.
 - c. Other concrete not exposed to freezing, thawing or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
3. Water-Reducing Admixture: ASTM C 494, Type A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 4. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
 5. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
 6. Water-Reducing, Retarding Admixture: ASTM C 494, Type D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.
 7. Shrinkage-Reducing Admixture: Eclipse Floor 200 (by Grace Concrete Products) or Tetraguard AS20 (by BASF) proportioned in accordance with manufacturer's specifications to meet required maximum drying shrinkage requirements listed above.
 - a. Dosage: For bidding purposes only, assume 1.5 gallon of admixture per cubic yard of concrete. Final optimum dosage and mix design shall be determined by the concrete supplier/manufacturer based on testing prior to construction.
 - b. Admixture volume shall replace equal volume water.
 - c. Water-reducing admixtures: Use only near neutral setting polycarboxylate-based water-reducing admixtures that are compatible with shrinkage-reducing admixtures listed above.
 - d. Site-mixing of admixtures not allowed.

2.5 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
 1. Products or approved:
 - a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
 - b. Concrete Sealants Inc.; Conseal CS-231.
 - c. Greenstreak; Swellstop.
 - d. Progress Unlimited, Inc.; Superstop.

2.6 WATER CURING MATERIALS

- A. Conform to ACI 308, 2.2 – Water Curing methods. Sheet curing procedures except as otherwise accepted by Architect.
- B. Sheet Curing Materials:
 - 1. Kraft Curing Paper: ASTM C 171, Type 1.1.1.2, two sheets of reinforced kraft paper cemented together with bituminous adhesive with one white reflective surface, non-staining, moisture retentive.
 - 2. Polyethylene Curing Film: ASTM C 171 Type 1.1.2.2, 10 mil thick, opaque white on one side.
 - 3. White Burlap-Polyethylene Sheeting: ASM C 171 Type 1.1.3, burlap with 10 mil opaque white polyethylene coating.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Interior Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 **or** aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.
 - 1. Acceptable Products:
 - a. Epoxy Sealant: Vexcon, Power Coat Epoxy Flexible Joint Sealant, Web Site <http://www.vexcon.com>
 - b. Polyurea Sealant: VersaFlex, SL/75, Web Site <http://www.versaFlex.com>.
 - c. *Curecrete CreteFill Pro 85 MI (Addendum 3)*
 - 2. Backer Rod: As instructed by manufacturer.
- C. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- D. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- E. Bonding Agent: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, non-load bearing, for general bonding of freshly mixed concrete to hardened concrete in accordance with General Structural Notes.
 - 2. See General Structural Notes for epoxy adhesive to be used for grouting of dowels, anchor rods, etc. where specified.

2.8 PROPORTIONING AND DESIGNING MIXES

- A. Design mixes to provide normal weight concrete to comply with requirements indicated in “General Structural Notes” on the drawings.
- B. Slump Limits: as indicated in “General Structural Notes.”
- C. Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect and Structural Engineer.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.
- E. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- F. Alkalinity: Concrete supplier and installer are responsible for providing a slab that meets the criteria below, including remediation if necessary.
 - 1. Slab shall have measured pH ranging between 9 and 10 or as required by flooring manufacturer, whichever is more stringent.
 - 2. Tests shall be performed as specified in Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing.”

2.9 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified in the General Structural Notes.
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Not permitted without prior approval from Architect.
- C. No water shall be added to concrete mix on site.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static and dynamic loads that might be applied until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - 1. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - a. Class A, 1/8 inch for smooth-formed finished surfaces.
 - b. Class B, 1/4 inch for rough-formed finished surfaces.
- C. Construct forms to sizes, shapes, lines and dimensions shown and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- E. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- I. Forms for Slabs: Set edge forms, bulkheads and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.3 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
- C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.4 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.5 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.6 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.7 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
- B. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- D. Accurately position, support and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.
- E. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.8 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 1. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
 - 2. Place construction joints perpendicular to main reinforcement. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect and Structural Engineer. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements. Provide additional reinforcement at construction joints per Structural Drawings.
 - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. See structural drawings for other requirements.
- B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into square pattern spaced at 15 feet o.c. maximum to pattern as indicated on drawings. If joint pattern not shown, provide drawings for Architect's approval showing joints not exceeding 15 feet in either direction and located to conform

to bay spacing wherever possible (at column centerlines, half bays, third bays). Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - a. Saw joints as soon as Testing Lab has completed taking the slab flatness and levelness readings, and as soon as the slab will support the weight of the saw and operator without disturbing the final finish. Normally 2 hours maximum after final finishing or 150 psi.
- C. Isolation Joints in Slab-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- D. Contraction Joints at Concrete Topping Over Metal Deck: Cut weakened-plane contraction joints, sectioning concrete into square pattern spaced at 15 feet o.c. maximum to pattern as indicated on drawings. If joint pattern not shown, provide drawings for Architect's approval showing joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays). Construct contraction joints for a maximum depth of 1/4-inch as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - a. Saw joints as soon as Testing Lab has completed taking the slab elevation readings, and as soon as the slab will support the weight of the saw and operator without disturbing the final finish. Normally 2 hours maximum after final finishing or 150 psi.

3.9 CONCRETE TOPPING SLABS

A. Topping Slabs on Metal Deck:

1. Broom and vacuum clean. Remove all bond inhibiting materials, including plastic ferrules where shear studs occur.
2. Install reinforcing steel and other cast-in items. Electrical conduits shall not be embedded in topping slabs without prior approval from Structural Engineer.

3.10 WATERSTOPS

- #### A. Self-Expanding Strip Waterstops: Install in all construction joints at the elevator pit and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.11 CONCRETE PLACEMENT

- #### A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast in. Notify other trades to permit installation of their work.
- #### B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- #### C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- #### D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- #### E. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
- #### F. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- #### G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

- H. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
- I. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- J. Maintain reinforcing in proper position on chairs during concrete placement.
- K. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- L. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
- M. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- N. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- O. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
- P. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
- Q. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
- R. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
- S. Use water-reducing retarding admixture when required by high temperatures, low humidity or other adverse placing conditions, as acceptable to Architect.

3.12 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.13 MONOLITHIC SLAB FINISHES

- A. Float Finish: After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. When surface water has disappeared or when concrete has stiffened sufficiently to permit power-driven floats, begin floating operation with power-driven floats using float blades or float shoes only, or by hand-floating if area is small or inaccessible to power units. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture. Uniformly slope surfaces to drains.
 - 1. Apply float finish to surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing membrane or elastic roofing; and where indicated.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks, and are uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Typical Slab: Apply the minimum of a double trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - a. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch for typical slabs and 1/8 inch for Multi-Purpose/Gym slabs.
 - 2. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic tile is to be installed by thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - a. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

- C. Ground and Polished Floor Slabs: Apply the minimum of a triple trowel finish to surfaces scheduled for ground and polished finish.
- D. Finish to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - 1. Typical Concrete Slabs Unless Otherwise Noted:
 - a. Specified overall values of flatness and levelness:
 - 1) F(F) 35; and F(L) 25;
 - b. Specified minimum local values of flatness and levelness:
 - 1) F(F) 24; and F(L) 17.
 - 2. Ground and Polished Concrete Slabs Left Exposed to View as Finish Concrete Surfaces and Concrete Slab Below Wood Athletic Floor:
 - a. Specified overall values of flatness and levelness:
 - 1) F(F) 45; and F(L) 35;
 - b. Specified minimum local values of flatness and levelness:
 - 1) F(F) 30; and F(L) 24.
 - 3. Finish: In order to achieve the desired final appearance of the ground and polished concrete, it is critical that the slabs meet or exceed the listed flatness and levelness tolerances. In the event that they do not, it will be the responsibility of the General Contractor to take whatever actions necessary to meet these tolerances. This shall be done at no additional costs to the Owner.

3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.15 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply

according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

1. Apply an evaporation-control compound to all slabs to be exposed in their final condition.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days.
- C. It is the contractor's responsibility to ensure that curing procedures avoid slab curl. The Contractor shall use all means necessary to avoid slab curling beyond slab levelness tolerances specified elsewhere herein. Such means include but are not limited to (1) use of an anti-curl mix, (2) avoidance of high-early strength concrete, (3) use of maximum practical aggregate size, (4) avoidance of high range water reducers, (5) protect top surface from too-cold or too-warm temperatures.
- D. Curing Methods: Moisture Curing Concrete Slabs:
1. Moisture cure for 7 days using a waterproof sheet curing paper, blanket, or sheeting methods (see ACI 302.1R and ACI 308) prevents evaporation and maintains equalized moisture content through slab thickness.
- E. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- F. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
- G. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.
- H. Concrete slabs that are to receive adhesive secured floor coverings shall be based on mix designs, employ placement scheduling, follow placement procedures and be cured in a manner to achieve moisture content levels consistent with floor covering manufacturer's requirements for installation. If moisture levels in the slab exceed those recommended by resilient flooring manufacturer at the time scheduled for flooring installation, adjust schedule to preserve Contract Substantial Completion date and take steps necessary to allow installation of flooring including, but not limited, to dehumidification of spaces, sealers and toppings acceptable to flooring manufacturer and Architect or other measures as required to meet flooring manufacturer's recommendation for flooring installation.

3.16 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install weak concrete mortar joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints that will be covered by resilient flooring or ceramic tile. Overfill joint and strike joint filler flush with top of joint prior to fully setting up. Substitute an epoxy or polyurea based joint filler where exposed sealed concrete slabs are specified trimming after hardening.

3.17 SEALER

- A. Apply sealer where indicated. Application shall be in strict accordance with manufacturer's instructions after moisture content has stabilized within sealer manufacturers limits for application. Apply no sealer to areas not indicated to be sealed concrete at completion of construction. Do not use sealer as a curing compound.

3.18 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
- C. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- D. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

- E. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
- F. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
- G. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
- H. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
- I. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- J. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- K. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- L. Repair methods not specified above may be used, subject to acceptance of Architect.

3.19 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

- D. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
- E. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- F. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
- G. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
- H. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. or more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- I. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
- J. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
- K. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- L. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
- M. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- N. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- O. Additional Testing: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not

been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other means as directed.

- P. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.
- Q. Concrete Slabs Receiving Carpet or Resilient Flooring Systems:
1. No sealers, curing agents or other fluid applied coatings shall be applied to concrete slabs that are to be covered by carpet or resilient flooring.
 2. Perform testing by special inspector to verify concrete substrate moisture emissions, relative humidity moisture content, and pH. Verify results as in conformance to flooring warranty provisions of finish flooring manufacturers.-
 - a. See Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete moisture testing.
 3. Concrete Slab Moisture Criteria: Verify all values meet finish flooring manufacturers flooring warranty provisions.
 - a. Relative Humidity: Maximum 85% unless noted otherwise by warranty provisions of finish flooring manufacturer.
 4. Percent Relative Humidity within Concrete Floor Slabs: Test to ASTM F2170.
 - a. See Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete moisture testing. Verify results in conformance to flooring warranty provisions of finish flooring manufacturers.
 - b. Alkalinity of Concrete Substrate: Test to ASTM F710. - See Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete alkalinity testing. Verify results in conformance to flooring warranty provisions of finish flooring manufacturers.
 5. Take all necessary measures to adjust concrete slab moisture and alkalinity to levels acceptable according to the installation recommendations and warranty provisions of finish flooring manufacturer. All such measures shall be at no additional cost to the Owner.

3.20 PROTECTION OF CONCRETE FLOORS TO BE LEFT EXPOSED

- A. Provide Poly-Craft Mask by PRO TECT® or similar product with equal performance.
- B. Install per manufacturer’s instructions. Tape the seams.
- C. Diaper all hydraulic powered equipment.
- D. Do not cut any ductwork, piping, electrical conduit, or studs on the slab.

- E. Any rubber-tired vehicles shall have tires manufactured from non-scuff white rubber.
- F. Inform all trades that slab is to be protected at all times.
- G. Do not use acids or acidic detergents on slab.
- H. Do not store any materials on slab.

END OF SECTION 033000

dj: August 23, 2017/cpl:

dj: November 21, 2017, QC

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures and finishes for the following:

1. Foundations and footings.
2. Slabs-on-grade.
3. Elevated slab on metal deck.
4. Retaining walls.
5. Access ramps and walkways.
6. Waterstops.

- B. Related Sections:

1. Division 01 "Sustainable Requirements."
2. Division 03 Section "Architectural Concrete Finishing" for finishing of exposed concrete slabs at selected areas.
3. Division 07 Section "Bituminous Dampproofing" for coatings on concrete surfaces below grade.
4. Division 07 Section "Sheet Waterproofing" for bentonite waterproofing at footings and foundation walls adjacent to occupied areas.
5. Division 07 Section "Water Repellents" for sealing typical concrete walls.
6. Division 07 Section "Thermal Insulation."
7. Division 07 Section "Below-Grade Vapor Retarders".
8. Division 07 Section "Joint Sealants" for sealing concrete joints.
9. Division 31 Section "Earthwork" for drainage (capillary break) fill under slabs on grade.
10. Division 32 Section "Concrete Paving" for concrete pavement and walks.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Refer to General Structural Notes for requirements.

- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Shop drawings for reinforcement detailing fabricating, bending and placing concrete reinforcement. Comply with ACI 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures” showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures. Show all wall elevations.
- D. Laboratory test reports for concrete materials and mix design test.
- E. Welding certificates. Welders shall be WABO or AWS certified.
- F. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Provide mix submittal highlighting the extent of fly ash replacement, including dollar value.
- B. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- C. Cut sheets or other documentation for each product/material highlighting recycled content information.
- D. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.6 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. American Concrete Institute (ACI) 301, “Specifications for Structural Concrete for Buildings.”
 - 2. ACI 318, “Building Code Requirements for Reinforced Concrete.”
 - 3. Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice.”
 - 4. ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”
- B. Concrete Testing Service: Comply with provisions of Division 01 Section “Quality Requirements” and Division 01 Section “Testing and Inspection Services”.

- C. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."
- D. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Coordination."
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORMING SYSTEM

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge sealed, with each piece bearing legible inspection trademark.
- B. Form for Unexposed Finish Concrete: Plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOC's) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade as indicated in "General Structural Notes" on drawings.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

- C. Fly Ash: ASTM C 618, Type F. 15-45% of the cement mix.
- D. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded, and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
- F. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.
- G. Water: ASTM C 94/C 94 M and potable.
- H. Concrete Strength: See General Structural Notes for required minimum strengths for structural concrete members. Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency for preparing and reporting proposed mix designs.
- I. Mixes shall be proportioned so as not to exceed the maximum slumps indicated.
- J. Water-Cementitious Material Ratio: See General Structural Notes.
- K. Shrinkage-Reducing Concrete: **Concrete mixes for members exposed upon their final condition** shall be proportioned such that the **slab drying shrinkage shall not exceed 0.03% at 90 days** (laboratory conditions). Submit strength and shrinkage test data and mix design to the architect and structural engineer for review a minimum of two weeks prior to placing any concrete.
 - 1. Water-Cement Ratio: 0.40 maximum
 - 2. Strength: Per General Structural Notes
 - 3. Aggregate: Gradation well proportioned and distributed with largest topsize coarse aggregate of ¾ inch.
 - 4. Fly Ash or Slag: Maximum 15%
 - 5. Testing: Trial mixtures tested for shrinkage reduction prior to construction
 - 6. Admixtures: See approved admixtures in section below.
- L. Admixtures:
 - 1. General: Provide concrete admixtures that contain not more than 0.05 percent chloride ions.
 - 2. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

- a. Use air-entraining admixture in exterior exposed concrete. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - b. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure: 5 to 7 percent air unless indicated otherwise in Structural Notes.
 - c. Other concrete not exposed to freezing, thawing or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
3. Water-Reducing Admixture: ASTM C 494, Type A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 4. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
 5. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
 6. Water-Reducing, Retarding Admixture: ASTM C 494, Type D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.
 7. Shrinkage-Reducing Admixture: Eclipse Floor 200 (by Grace Concrete Products) or Tetraguard AS20 (by BASF) proportioned in accordance with manufacturer's specifications to meet required maximum drying shrinkage requirements listed above.
 - a. Dosage: For bidding purposes only, assume 1.5 gallon of admixture per cubic yard of concrete. Final optimum dosage and mix design shall be determined by the concrete supplier/manufacturer based on testing prior to construction.
 - b. Admixture volume shall replace equal volume water.
 - c. Water-reducing admixtures: Use only near neutral setting polycarboxylate-based water-reducing admixtures that are compatible with shrinkage-reducing admixtures listed above.
 - d. Site-mixing of admixtures not allowed.

2.5 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
 1. Products or approved:
 - a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
 - b. Concrete Sealants Inc.; Conseal CS-231.
 - c. Greenstreak; Swellstop.
 - d. Progress Unlimited, Inc.; Superstop.

2.6 WATER CURING MATERIALS

- A. Conform to ACI 308, 2.2 – Water Curing methods. Sheet curing procedures except as otherwise accepted by Architect.
- B. Sheet Curing Materials:
 - 1. Kraft Curing Paper: ASTM C 171, Type 1.1.1.2, two sheets of reinforced kraft paper cemented together with bituminous adhesive with one white reflective surface, non-staining, moisture retentive.
 - 2. Polyethylene Curing Film: ASTM C 171 Type 1.1.2.2, 10 mil thick, opaque white on one side.
 - 3. White Burlap-Polyethylene Sheeting: ASM C 171 Type 1.1.3, burlap with 10 mil opaque white polyethylene coating.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Interior Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 **or** aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.
 - 1. Acceptable Products:
 - a. Epoxy Sealant: Vexcon, Power Coat Epoxy Flexible Joint Sealant, Web Site <http://www.vexcon.com>
 - b. Polyurea Sealant: VersaFlex, SL/75, Web Site <http://www.versaFlex.com>.
 - c. *Lskfjsldj (Addendum 1)*
 - 2. Backer Rod: As instructed by manufacturer.
- C. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- D. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- E. Bonding Agent: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, non-load bearing, for general bonding of freshly mixed concrete to hardened concrete in accordance with General Structural Notes.
 - 2. See General Structural Notes for epoxy adhesive to be used for grouting of dowels, anchor rods, etc. where specified.

2.8 PROPORTIONING AND DESIGNING MIXES

- A. Design mixes to provide normal weight concrete to comply with requirements indicated in “General Structural Notes” on the drawings.
- B. Slump Limits: as indicated in “General Structural Notes.”
- C. Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect and Structural Engineer.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.
- E. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- F. Alkalinity: Concrete supplier and installer are responsible for providing a slab that meets the criteria below, including remediation if necessary.
 - 1. Slab shall have measured pH ranging between 9 and 10 or as required by flooring manufacturer, whichever is more stringent.
 - 2. Tests shall be performed as specified in Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing.”

2.9 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified in the General Structural Notes.
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Not permitted without prior approval from Architect.
- C. No water shall be added to concrete mix on site.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static and dynamic loads that might be applied until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - 1. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - a. Class A, 1/8 inch for smooth-formed finished surfaces.
 - b. Class B, 1/4 inch for rough-formed finished surfaces.
- C. Construct forms to sizes, shapes, lines and dimensions shown and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- E. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- I. Forms for Slabs: Set edge forms, bulkheads and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.3 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
- C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.4 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.5 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.6 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.7 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
- B. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- D. Accurately position, support and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.
- E. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.8 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 1. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
 - 2. Place construction joints perpendicular to main reinforcement. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect and Structural Engineer. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements. Provide additional reinforcement at construction joints per Structural Drawings.
 - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. See structural drawings for other requirements.
- B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into square pattern spaced at 15 feet o.c. maximum to pattern as indicated on drawings. If joint pattern not shown, provide drawings for Architect's approval showing joints not exceeding 15 feet in either direction and located to conform

to bay spacing wherever possible (at column centerlines, half bays, third bays). Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - a. Saw joints as soon as Testing Lab has completed taking the slab flatness and levelness readings, and as soon as the slab will support the weight of the saw and operator without disturbing the final finish. Normally 2 hours maximum after final finishing or 150 psi.
- C. Isolation Joints in Slab-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- D. Contraction Joints at Concrete Topping Over Metal Deck: Cut weakened-plane contraction joints, sectioning concrete into square pattern spaced at 15 feet o.c. maximum to pattern as indicated on drawings. If joint pattern not shown, provide drawings for Architect's approval showing joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays). Construct contraction joints for a maximum depth of 1/4-inch as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - a. Saw joints as soon as Testing Lab has completed taking the slab elevation readings, and as soon as the slab will support the weight of the saw and operator without disturbing the final finish. Normally 2 hours maximum after final finishing or 150 psi.

3.9 CONCRETE TOPPING SLABS

A. Topping Slabs on Metal Deck:

1. Broom and vacuum clean. Remove all bond inhibiting materials, including plastic ferrules where shear studs occur.
2. Install reinforcing steel and other cast-in items. Electrical conduits shall not be embedded in topping slabs without prior approval from Structural Engineer.

3.10 WATERSTOPS

- #### A. Self-Expanding Strip Waterstops: Install in all construction joints at the elevator pit and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.11 CONCRETE PLACEMENT

- #### A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast in. Notify other trades to permit installation of their work.
- #### B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- #### C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- #### D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- #### E. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
- #### F. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- #### G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

- H. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
- I. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- J. Maintain reinforcing in proper position on chairs during concrete placement.
- K. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- L. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
- M. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- N. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- O. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
- P. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
- Q. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
- R. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
- S. Use water-reducing retarding admixture when required by high temperatures, low humidity or other adverse placing conditions, as acceptable to Architect.

3.12 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.13 MONOLITHIC SLAB FINISHES

- A. Float Finish: After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. When surface water has disappeared or when concrete has stiffened sufficiently to permit power-driven floats, begin floating operation with power-driven floats using float blades or float shoes only, or by hand-floating if area is small or inaccessible to power units. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture. Uniformly slope surfaces to drains.
 - 1. Apply float finish to surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing membrane or elastic roofing; and where indicated.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks, and are uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Typical Slab: Apply the minimum of a double trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - a. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch for typical slabs and 1/8 inch for Multi-Purpose/Gym slabs.
 - 2. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic tile is to be installed by thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - a. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

- C. Ground and Polished Floor Slabs: Apply the minimum of a triple trowel finish to surfaces scheduled for ground and polished finish.
- D. Finish to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - 1. Typical Concrete Slabs Unless Otherwise Noted:
 - a. Specified overall values of flatness and levelness:
 - 1) F(F) 35; and F(L) 25;
 - b. Specified minimum local values of flatness and levelness:
 - 1) F(F) 24; and F(L) 17.
 - 2. Ground and Polished Concrete Slabs Left Exposed to View as Finish Concrete Surfaces and Concrete Slab Below Wood Athletic Floor:
 - a. Specified overall values of flatness and levelness:
 - 1) F(F) 45; and F(L) 35;
 - b. Specified minimum local values of flatness and levelness:
 - 1) F(F) 30; and F(L) 24.
 - 3. Finish: In order to achieve the desired final appearance of the ground and polished concrete, it is critical that the slabs meet or exceed the listed flatness and levelness tolerances. In the event that they do not, it will be the responsibility of the General Contractor to take whatever actions necessary to meet these tolerances. This shall be done at no additional costs to the Owner.

3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.15 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply

according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

1. Apply an evaporation-control compound to all slabs to be exposed in their final condition.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days.
- C. It is the contractor's responsibility to ensure that curing procedures avoid slab curl. The Contractor shall use all means necessary to avoid slab curling beyond slab levelness tolerances specified elsewhere herein. Such means include but are not limited to (1) use of an anti-curl mix, (2) avoidance of high-early strength concrete, (3) use of maximum practical aggregate size, (4) avoidance of high range water reducers, (5) protect top surface from too-cold or too-warm temperatures.
- D. Curing Methods: Moisture Curing Concrete Slabs:
 1. Moisture cure for 7 days using a waterproof sheet curing paper, blanket, or sheeting methods (see ACI 302.1R and ACI 308) prevents evaporation and maintains equalized moisture content through slab thickness.
- E. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- F. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
- G. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.
- H. Concrete slabs that are to receive adhesive secured floor coverings shall be based on mix designs, employ placement scheduling, follow placement procedures and be cured in a manner to achieve moisture content levels consistent with floor covering manufacturer's requirements for installation. If moisture levels in the slab exceed those recommended by resilient flooring manufacturer at the time scheduled for flooring installation, adjust schedule to preserve Contract Substantial Completion date and take steps necessary to allow installation of flooring including, but not limited, to dehumidification of spaces, sealers and toppings acceptable to flooring manufacturer and Architect or other measures as required to meet flooring manufacturer's recommendation for flooring installation.

3.16 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install weak concrete mortar joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints that will be covered by resilient flooring or ceramic tile. Overfill joint and strike joint filler flush with top of joint prior to fully setting up. Substitute an epoxy or polyurea based joint filler where exposed sealed concrete slabs are specified trimming after hardening.

3.17 SEALER

- A. Apply sealer where indicated. Application shall be in strict accordance with manufacturer's instructions after moisture content has stabilized within sealer manufacturers limits for application. Apply no sealer to areas not indicated to be sealed concrete at completion of construction. Do not use sealer as a curing compound.

3.18 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
- C. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- D. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

- E. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
- F. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
- G. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
- H. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
- I. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- J. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- K. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- L. Repair methods not specified above may be used, subject to acceptance of Architect.

3.19 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

- D. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
- E. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- F. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
- G. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
- H. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. or more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- I. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
- J. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
- K. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- L. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
- M. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- N. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- O. Additional Testing: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not

been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other means as directed.

- P. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.
- Q. Concrete Slabs Receiving Carpet or Resilient Flooring Systems:
1. No sealers, curing agents or other fluid applied coatings shall be applied to concrete slabs that are to be covered by carpet or resilient flooring.
 2. Perform testing by special inspector to verify concrete substrate moisture emissions, relative humidity moisture content, and pH. Verify results as in conformance to flooring warranty provisions of finish flooring manufacturers.-
 - a. See Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete moisture testing.
 3. Concrete Slab Moisture Criteria: Verify all values meet finish flooring manufacturers flooring warranty provisions.
 - a. Relative Humidity: Maximum 85% unless noted otherwise by warranty provisions of finish flooring manufacturer.
 4. Percent Relative Humidity within Concrete Floor Slabs: Test to ASTM F2170.
 - a. See Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete moisture testing. Verify results in conformance to flooring warranty provisions of finish flooring manufacturers.
 - b. Alkalinity of Concrete Substrate: Test to ASTM F710. - See Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete alkalinity testing. Verify results in conformance to flooring warranty provisions of finish flooring manufacturers.
 5. Take all necessary measures to adjust concrete slab moisture and alkalinity to levels acceptable according to the installation recommendations and warranty provisions of finish flooring manufacturer. All such measures shall be at no additional cost to the Owner.

3.20 PROTECTION OF CONCRETE FLOORS TO BE LEFT EXPOSED

- A. Provide Poly-Craft Mask by PRO TECT® or similar product with equal performance.
- B. Install per manufacturer’s instructions. Tape the seams.
- C. Diaper all hydraulic powered equipment.
- D. Do not cut any ductwork, piping, electrical conduit, or studs on the slab.

- E. Any rubber-tired vehicles shall have tires manufactured from non-scuff white rubber.
- F. Inform all trades that slab is to be protected at all times.
- G. Do not use acids or acidic detergents on slab.
- H. Do not store any materials on slab.

END OF SECTION 033000

dj: August 23, 2017/cpl:

dj: November 21, 2017, QC

SECTION 033543 - ARCHITECTURAL CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes:

1. Grinding and polishing of new concrete floors with silicate sealer and densifier floor finish system.

- B. Related Sections:

1. Division 03 Section "Cast-In-Place Concrete" for the complete installation of all concrete floor slabs and including all floor slab protection up to Substantial Completion.

1.3 QUALITY ASSURANCE

- A. Polisher Qualifications:

1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
2. Supervision: Maintain competent supervisor who is at Project during times specified work is in progress, ~~and is currently certified as Craftsman or Master Craftsman by CPAA.~~ *who is familiar with the specified requirements and the methods needed for proper performance of work of this section. (Addendum 3)*
3. Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.
4. *The special concrete finish manufacturer shall certify applicator. (Addendum 3)*

- B. Walkway Auditor: Certified by NFSI to test polished floors for static coefficient of friction according to NFSI 101-A.

- C. Static Coefficient of Friction: Achieve not less than 0.5 for level floor surfaces as determined by quality control testing according to NFSI 101-A.

- D. Field Mock-up for Aesthetic Purposes: Before performing work of this Section, provide as many field mock-ups required to verify selections made under submittals and to demonstrate aesthetic effects of polishing. Approval does not constitute approval of deviations from Contract Documents, unless such deviations are specifically approved by Architect in writing.

1. Grind, hone, and polish 12 square foot floor area for each finish approved under sample submittals; include edges and joints.
2. Use same personnel, including supervisors, which will perform work.
3. Install products and materials according to specified requirements.
4. Work shall be representative of those to be expected for work.
5. Finish various components to show maximum variation that will exist in work.
6. Approval is for following aesthetic qualities:
 - a. Compliance with approved submittals.
 - b. Uniformity of sheen.
 - c. Uniformity of color.
7. Obtain Architect's approval before starting work on Project.
8. Protect approved field mock-ups from elements with weather resistant covering.
9. Maintain field mock-ups during construction in an undisturbed condition as a standard for judging completed work.
10. Do not demolish, alter, or remove field mock-ups until acceptable to Owner and Architect.
11. *In place mockups that pass aesthetic criteria and remain part of the construction are acceptable. (Addendum 2)*

1.4 PERFORMANCE CRITERIA

- A. Polishing Systems shall have the following minimum performance properties:
 1. ASTM C-642 Absorption: Reduction of 75% of Control
 2. ASTM D-5178 Balance Beam Mar Tester: Greater than 50% harder.
 3. ASTM D-4060 Modified Taber Abrasion 600 Rev: 0.37% treated vs. 0.68% untreated.
 4. ASTM G-154: 5000 HR QUV: No fade, change or erosion.
 5. ASTM D-2369 Solids: 18% Minimum.
 6. ASTM D-2047 Coefficient of Friction: Average 0.54
 7. Reflectivity: Change in gloss to 30, as measured using a gloss meter in accordance with Horiba IG-320 Gloss Checker
 8. ASTM C-1378 Stain resistance: Food, chemical, oil and common stain resistance
 9. ASTM E-84 Surface burning of building materials:
 - a. Class A Flame Spread Index <25 – Results: 0
 - b. Smoked Developed Index < 450 – Results: 0
 10. ANSI B-101.1-2009 Non-slip properties: High Traction Rating.

1.5 PREINSTALLATION MEETING

- A. Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct conference at Project to comply with requirements of applicable Division 01 Sections.
 1. Required Attendees:
 - a. Owner.

- b. Architect.
 - c. Contractor, including supervisor.
 - d. Concrete producer.
 - e. Concrete finisher, including supervisor.
 - f. Concrete polisher, including supervisor.
 - g. Technical representative of liquid applied product manufacturers.
 - h. Walkway auditor.
2. Minimum Agenda: Polisher shall demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
- a. Tour mock-up and representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of procedures, and other preparatory work performed by other installers.
 - b. Review Contract Document requirements.
 - c. Review approved submittals.
 - d. Review procedures, including, but not limited to:
 - 1) Details of each step of grinding, honing, and polishing operations.
 - 2) Application of liquid applied products.
 - 3) Protecting concrete floor surfaces until polishing work begins.
 - 4) Protecting polished concrete floors after polishing work is completed.
3. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.6 FIELD CONDITIONS

- A. Damage and Stain Prevention: Take precautions to prevent damage and staining of concrete surfaces to be polished.
1. Prohibit vehicle parking over concrete surfaces to be polished.
 2. Prohibit pipe cutting operations over concrete surfaces to be polished.
 3. Prohibit storage of any items over concrete surfaces to be polished for not less than 28 days after concrete placement.
 4. Prohibit ferrous metals storage over concrete surfaces to be polished.
 5. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces to be polished.
 6. Protect from acids and acidic detergents contacting concrete surfaces to be polished.
 7. Protect from painting activities over concrete surfaces to be polished.
- B. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting liquid applied product application.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store material in dry, enclosed area protected from exposure to moisture and temperatures below 50 degrees F.
 - 1. Keep containers closed and upright to prevent leakage.
 - 2. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of lot numbers.

1.8 WARRANTY

- A. Provide 20 year manufacturer's material warranty that polished surface will remain water repellent, dustproof, hardened, abrasion resistant and food stain resistant.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturers: Architectural Concrete Finish products manufactured and supplied by the following manufacturer subject to compliance with requirements:
 - 1. Basis-of-Design Product: Vexcon Chemicals, Inc., Certi-Shine Clear FSR Polished Systems.
- B. Alternate Manufacturers: Use of Architectural Concrete Finish products other than the specified products may be used upon approval of pre-bid substitution request. Approval criteria include, but are not limited to, aesthetic acceptability as determined by the Architect, and whether use of a product other than the basis of design product will result in revisions to other components of the Work.
 - 1. RetroPlate Products, RetroPlate 99 & RetroGuard
- C. Installers:
 - 1. Berkshire Concrete Restoration, Ridgefield, WA (360) 910-9209.
 - 2. Concrete Restoration, Seattle, WA (206) 937-0415.
 - 3. ~~Meidling Concrete~~ Cameron-Reilly Concrete, Spokane Valley, WA (509) 924-7180 466-5555 (Addendum 1).
 - 4. Others as approved.
- D. Materials: Provide all materials from one manufacturer:
 - 1. Strippers, Primers, Hardeners, Densifiers and Seal Coatings: Product of manufacturer recommended for substrate and use indicated.

2.2 LIQUID APPLIED PRODUCTS

- A. Liquid Densifier: Odorless, non-hazardous, silicate that penetrates concrete to react with free lime and calcium hydroxide to produce permanent chemical reaction that hardens and densifies concrete surface.
- B. Polish Guard: Non-film forming, stain resistant, food resistant, chemical stain resistant, impregnating sealant designed to be used on concrete surfaces previously densified.

2.3 ACCESSORIES

- A. Patching Compound: Compound composed of 40 percent portland cement, 45 percent limestone, and 15 percent vinyl acetate copolymer, when mixed with dust salvaged from grinding process forms a paste that hardens when surface imperfections are filled.
- B. Grout Material: Clear modified silicate sealant, containing no pore clogging latex, when mixed with dust salvaged from grinding process forms a paste that reacts with calcium hydroxide in concrete that hardens when surface imperfections are filled.
- C. Protective Cover: Non-woven, puncture and tear resistant, polypropylene fibers laminated with a multi-ply, textured membrane, not less than 18 mils in thickness.

2.4 POLISHING EQUIPMENT

- A. Field Grinding and Polishing Equipment:
 - 1. Variable speed, multiple head, counter-rotating, walk-behind machine with not less than 600 pounds of down pressure on grinding or diamond polishing pads.
 - 2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.
- B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field grinding and polishing equipment.
- C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.
- D. Metal Bonded Pads: Grinding pads with embedded industrial grade diamonds of varying grits fabricated for mounting on equipment.
- E. Resin Bonded Pads: Polishing pads with embedded industrial grade diamonds of varying grits fabricated for mounting on equipment.
- F. Burnishing Pads: Maintenance pads for use with high speed burnishing equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions:
 - 1. Examine substrates to be polished for compliance with requirements and other conditions affecting performance.
 - 2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
 - 3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 PREPARATION

- A. Concrete: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with staining and sealing materials.
 - 1. Power sweep floor area, blow-out comers and column footing and plinths. Use sweeping compound to control airborne dust.
 - 2. Thoroughly clean concrete surfaced, removing all coatings, dirt, oil and laitance with concrete stripper as recommended by the finish materials manufacturer.
 - 3. Wet soak floor for minimum duration recommended by the finish materials manufacturer; scrub with automatic scrubber with minimum head pressure and with detergents as recommended by the finish materials manufacturer.
 - 4. Repair damaged and deteriorated concrete according to manufacturer's written recommendations.

- B. Dust Control: Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to protect in-place construction, prevent dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 VAPOR TESTING CONCRETE FLOORS

- A. Alkalinity:
 - 1. Test Method: Measure pH according to method indicated in ASTM F 710.
 - 2. Acceptable Results: pH between 8 and 10.

- B. Moisture Vapor Transmission Rate:
 - 1. Test Method: Perform anhydrous calcium chloride test according to ASTM F 1869.
 - 2. Acceptable Results: Not more than 5 pounds per 1000 square feet in 24 hours.

- C. Relative Humidity:
 - 1. Test Method: Perform relative humidity test using in situ probes according to ASTM F 2170.
 - 2. Acceptable Results: Not more than 75 percent.

3.4 POLISHING CONCRETE FLOORS

- A. Sequence of Polishing: Perform polishing before gypsum board is installed. Initial Grinding:
 - 1. Use grinding equipment with metal bonded grinding pads.
 - 2. Begin grinding in one direction using sufficient size grit pad.
 - 3. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass, up to 150 grit.

4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
 5. Vacuum floor using squeegee vacuum attachment after each pass.
 6. Continue grinding until aggregate exposure matches approved field mock-ups.
- B. Treating Surface Imperfections:
1. Mix patching compound and grout material with dust created by grinding operations to match color of adjacent concrete surface.
 2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids.
 3. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not reasonably noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.
- C. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow to cure according to manufacturer's instructions. [It is preferred to use less caustic colloidal silica-based densifiers as they are safer for workers and less burdensome on the environment.]
- D. Grout Grinding:
1. Use grinding equipment and appropriate grit grinding pads.
 2. While applying fresh grout material prior to, grind concrete in direction perpendicular to initial grinding to remove scratches.
 3. Vacuum floor using squeegee vacuum attachment after each pass.
- E. Honing:
1. Use grinding equipment with resin bonded grinding pads.
 2. Grind concrete in one direction starting with 50 grit pad and make as many sequential passes required to remove scratches, each pass perpendicular to previous pass, up to 400 grit pad reaching maximum refinement with each pass before proceeding to finer grit pads.
 3. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.
- F. Polishing:
1. Use polishing equipment with resin bonded polishing and burnishing pads.
 2. Begin polishing in one direction starting with 800 grit pad.
 3. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass, up to 3000 grit.
 4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
 5. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.
 6. Continue polishing until gloss appearance, as measured according to ASTM E 430, matches approved field mock-ups.
- G. Polish Guard: Uniformly apply and remove excessive liquid according to manufacturer's instructions.

- H. Final Polish: Using burnishing equipment and finest grit burnishing pads, burnish to uniform sheen matching approved mock-up.

- I. Final Polished Concrete Floor Finish:
 - 1. Aggregate Exposure: Class B
 - 2. Finished Gloss Level: Level 2, Low-Sheen Satin Gloss Appearance
 - a. Procedure: Recommended not less than 4 steps with full refinement of each diamond tool with one application of densifier.
 - b. Gloss Measurement: Determine the specular gloss by incorporating the following:
 - 1) Reflective Clarity Reading: Not less than 65 according to ASTM D5767 prior to the application of sealers.
 - 2) Reflective Sheen Reading: Not less than 35 according to ASTM D523 prior to the application of sealers.

3.5 CLEANING

- A. Remove grinding dust from installation and adjacent areas.

- B. Wash polished and stained architectural concrete finish surfaces with cleaner as recommended; rinse surfaces with water and allow to dry thoroughly.

- C. Protect completed work from damage.

END OF SECTION 033543

SECTION 042000 – UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:

1. Building (common) brick.
2. Mortar.
3. Masonry joint reinforcement.
4. Ties and anchors.
5. Embedded flashing.
6. Miscellaneous masonry accessories.

- B. Related Sections include the following:

1. Division 07 Section "Water Repellants and AntiGraffiti Coatings" for Water Repellent and Antigraffiti Treatment applied to masonry.
2. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
3. Division 07 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.
4. Division 08 Section "Louvers and Vents" for wall louvers and vents installed in exterior masonry assemblies.

- C. Products installed, but not furnished, under this Section include the following:

1. Steel lintels and shelf angles for unit masonry, furnished under Division 05 Section "Metal Fabrications."
2. Manufactured reglets in masonry joints for metal flashing, furnished under Division 07 Section "Sheet Metal Flashing and Trim."
3. Hollow metal frames in unit masonry openings, furnished under Division 08 Section "Hollow Metal Doors and Frames."
4. Aluminum window systems, furnished under Division 08 Section "Aluminum-Framed Entrances and Storefronts."

- D. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For the following include building elevations in shop drawings showing locations of the different CMU finishes:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Verification: For each type and color of the following:
1. Exposed masonry units.
 2. Weep holes/vents.
 3. Accessories embedded in masonry.
- D. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- E. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Joint reinforcement.
 5. Anchors, ties, and metal accessories.
- F. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- G. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- H. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- I. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing as required in accordance with "Testing and Inspection Services" section. Payment for these services will be made by Owner. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
- J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Meetings".
- K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Building mockup of typical wall area in sizes approximately 60 inches (1500 mm) long by 72 inches (1800 mm) high by full thickness, including accessories.
 - a. Provide samples of two architect selected mortar colors in mock up.
 - b. Include a sealant-filled joint at least 16 inches (400 mm) long in wall mockup.
 - c. Include lower corner of window opening at upper corner of wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
 - d. Include wall flashing installed for a 24 inch (600 mm) length in corner of wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12 inch (300 mm) length of flashing left exposed to view (omit masonry above half of flashing).
 - e. Include metal studs, sheathing, veneer anchors, flashing, and weep holes in masonry wall mockup.
 - 2. *In place mockups that remain part of the construction are acceptable. (Addendum 2)*

1.6 DELIVERY, STORAGE, AND HANDLING

- L. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- M. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- N. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

- O. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- P. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- Q. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- R. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed, painted or sealed. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- S. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- T. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.2 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face Brick: Facing brick complying with ASTM C 216.
1. Quality Standard Product: Ironstone L-4, 2-14 inch Norman, *texture Matte (Addendum I)*
 2. Manufacturer: Interstate Brick Company, 9780 S 5200 W, West Jordan, UT 84081
 3. Grade: SW
 4. Type: FBX or better
 5. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 9,000 psi.
 6. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
 7. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 8. Size (Actual Dimensions): 3-5/8 inch wide x 2-1/4 inch high x 11-5/8 inch long.
 9. Application: Use where brick is exposed unless otherwise indicated.
 10. Other acceptable Manufacturer & Product: *Pacific Clay, Brown Flashed Velour (Addendum I)*

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Masonry Cement: Not permitted.
- D. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C 404.
- F. Colored Mortar: Brick unit manufacturer to provide pre-mixed colored mortar as selected by the Architect.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- H. Water: Potable.

2.4 VENEER TIES AND ANCHORS

- A. Materials: Use the following materials for all veneer ties, anchors, and continuous joint reinforcing.
 1. Stainless-Steel Wire: ASTM A 580, Type 304.
 2. Stainless-Steel Sheet: ASTM A 167, Type 304.
- B. Adjustable Masonry-Veneer Seismic Anchors
 1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment to metal studs, or concrete and masonry back-up walls and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lb load in both tension and compression without deforming or developing play in excess of 0.05 inch.
 2. Anchor Assemblies: Hohmann & Barnard, Inc.; DW-10HS Byna-Lok Seismic Veneer Anchor, 14 gauge.
 3. Fasteners: As provided by manufacturer for metal studs, concrete, or masonry backup walls.
 4. Neoprene Gaskets: Screw-attached masonry veneer anchor manufacturer's standard closed cell neoprene gaskets manufactured to fit behind anchor plate and to prevent moisture from penetrating through screw holes to steel studs behind sheathing.

2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60, unless otherwise noted.

2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: See Section 076200 "Sheet Metal Flashing & Trim."

- B. Flexible Thru-Wall Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.0 mm).
 - a. Provide one of the following or approved:
 - 1) Advanced Building Products Inc.; Strip-N-Flash.
 - 2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; TeXtroflash Flashing.
 - 4) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 5) Polyguard Products Inc.; Polyguard 400.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Expansion-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use one of the following, unless otherwise indicated:
1. Honeycomb Plastic Weep/Vent: Medium-density polyethylene, 3/8-inch by 3-3/8 inches by 2-1/2 inches high, color per Architect.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Configuration: Provide one of the following:
 - a. Basis-of-Design Product: Subject to compliance, provide Mortar Net Solutions; CellVent or compatible product by one of the following:
 - 1) Advanced Building Products Inc.
 - 2) Heckmann Building Products, Inc.
 - 3) Wire-Bond.

2.8 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Manufacturers or approved:
 - a. Diedrick Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.9 MORTAR AND GROUT MATERIALS AND MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar.
 - 2. Limit cementitious materials in mortar to portland cement and lime.
 - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. Use Type S mortar throughout.
 - 2. Use Typ. Grey mortar for non-colored block.
- D. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- E. Hydrated Lime: ASTM C 207, Type S.
- F. Masonry Cement: Not permitted.
- G. Colored Mortar: Concrete masonry unit manufacturer to provide pre-mixed colored mortar for the installation of integral colored block.
 - 1. Aggregate for Grout: ASTM C 404

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 2. Verify that foundations are within tolerances specified.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- E. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
 - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 - 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 - 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 - 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
 - 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on the Drawings; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, and remove loose masonry units and mortar.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.5 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing or concrete backup walls with adjustable masonry-veneer seismic anchors to comply with the following requirements:
 - 1. Fasten anchors over insulation and through sheathing to wall framing or to concrete and masonry backup walls with metal fasteners provided by the manufacturer.
 - 2. Embed connector sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.0 square feet of wall area. Install additional anchors within 12 inches of openings and at intervals not exceeding 8 inches along vertical edges, adding 2 foot long segments of joint reinforcing for anchors that do not align with typical anchor rows beyond.

3.6 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form vertical control joints in brick using one of the following methods:
 - 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
 - 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
- C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants," but not less than 1/2 inch.
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.7 LINTELS

- A. Install hot-dip galvanized steel lintels where indicated. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated

3.8 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows, unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
 - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 - 4. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
 2. Space weep holes formed from plastic tubing 24 inches o.c.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.
- F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports.
1. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

3.10 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.11 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Structural steel.
 - 2. Non-shrink grout.
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 01 Section "Testing and Inspection Services" for independent testing agency procedures and administrative requirements.
 - 3. Division 05 Section "Steel Decking" for field installation of shear connectors.
 - 4. Division 05 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
 - 5. *Division 09 Section "Painting" (Addendum 3)*
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment and anchor bolt drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

- C. Welding certificates demonstrating compliance with the requirements of the "Quality Assurance" Article.
- D. Qualification Data: For installer and fabricator demonstrating compliance with the requirements of the "Quality Assurance" Article. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Direct-tension indicators.
 - 4. Tension-control, high-strength bolt-nut-washer assemblies.
 - 5. Weld filler metal for both shop and field-welds.
 - 6. Shop primers.
 - 7. Nonshrink grout.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer of structural steel shall have a minimum of five (5) years experience in structural steel installation, including involvement in not less than three (3) projects of similar, or greater, size and complexity.
- B. Fabricator Qualifications: Fabricator of structural steel shall have a minimum of five (5) years experience in structural steel fabrication, including involvement in not less than three (3) projects of similar or greater size and complexity. Fabricator shall have their own fabrications plant that has been operating for a minimum of five (5) years. Fabricator must participate in the AISC Quality Certification Program and be designated an AISC-Certified Plant for Conventional Steel Building Structures (SBD), *or pay for required shop fabrication inspections by the Owner's special inspection agency.*(Add 4)
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." In addition, all welders performing shop or field-welding of structural steel members shall be WABO certified, or equivalent, as accepted by the Structural Engineer and Building Official.
- D. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design or Load and Resistance Factor Design Specification for Structural Steel Buildings."
 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Meetings."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Structural Steel Shapes, Plates, Angles, Bars, and Rods: As specified in General Structural Notes.
- B. Welding Electrodes: Comply with AWS requirements and General Structural Notes.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex, Grade C, carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers (ASTM F 959, Type 325 compressible washers if direct-tension indicators are used).
1. Finish: Plain, uncoated, unless otherwise noted.
- B. Tension-Control, High-Strength Bolts: Shall be approved self load indicating types (Bethlehem Indicator Bolts, LeJeune Tension Control Bolts, etc.) and shall be installed in strict accordance with manufacturer's instructions. See General Structural Notes for required preparation of faying surfaces at slip-critical connections.

- C. Anchor Rods or Anchor Bolts: ASTM F 1554, Grade 36, unless otherwise noted. ASTM F 1554 Grade 55 (weldable) or Grade 105 shall be used where specifically indicated on drawings.
1. Configuration: Hooked, except use straight rods where specified on drawings with double nuts at embedded ends.
 2. Nuts: ASTM A 563 hex, Grade A, carbon steel nuts for Grade 36 rods up to 1-1/2 inches in diameter, unless otherwise noted. In accordance with ASTM F 1554 recommendations for other rod sizes and grades, unless otherwise noted.
 3. Plate Washers: ASTM A 36/A 36M carbon steel, minimum 5/16 inch thick of size required to completely cover hole in connected plate, unless otherwise noted.
 4. Finish: Plain, uncoated, unless otherwise noted.
- D. Threaded Rods: ASTM A 307, Grade A, unless otherwise noted.
1. Nuts: ASTM A 563 hex, Grade A, carbon steel.
 2. Washers: ASTM F 436 hardened or ASTM A 36/A 36M carbon steel.
 3. Finish: Plain, uncoated, unless otherwise noted.
- E. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- F. Threaded Studs (Denoted as "CPL's" on Drawings): ASTM A 108, type CPL Threaded Studs by Nelson Stud Welding Division, TRW Assemblies and Fasteners Group, or equivalent.
- G. Deformed Bar Anchors (Denoted as "D2L's" on Drawings): ASTM A 496, type D2L Deformed Bar Anchors by Nelson Stud Welding Division, TRW Assemblies and Fasteners Group, or equivalent.
- H. Clevises and Turnbuckles: ASTM A 108, Grade 1035, cold-finished carbon steel.
- I. Sleeve Nuts: ASTM A 108, Grade 1018, cold-finished carbon steel.
- J. Couplers: ASTM A 194 or ASTM A 563, size and grade as required to develop full capacity of connected materials. Couplers shall only be used at locations where specified on drawings or where approved by the Structural Engineer.

2.3 PRIMER

- A. ~~Primer: Fast-curing, lead and chromate-free, universal modified-alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements of FS TT-P-664. See Painting Section 099100. (Addendum 3)~~
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds and repair painting galvanized steel, with dry film containing not less than 93 percent zinc dust by weight, and complying with DOD-P21035A or SSPC-Paint 20.

2.4 NON-SHRINK GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time. Minimum compressive strength shall be 6,000 psi.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design or Load and Resistance Factor Design Specification for Structural Steel Buildings."
 - 1. Camber structural-steel members where indicated.
 - 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Holes: Cut, drill, or punch standard holes perpendicular to metal surfaces. Do not thermally cut holes or enlarge holes by burning without prior approval from Structural Engineer.
 - 1. Provide holes required for securing other work to structural steel and for passage of other work through steel framing members as indicated on drawings.
 - 2. Weld threaded nuts to framing and other specialty items indicated to receive other work.
 - 3. At pieces connected by threaded studs (CPL's), install 1/4 inch by 2 inch by 2 inch plate washers with oversized holes (holes shall be greater than diameter of weld flash at base of studs) between connected plies at each stud.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SP 1, "Solvent Cleaning," SSPC-SP 2, "Hand Tool Cleaning," or SSPC-SP 3, "Power Tool Cleaning."
- F. Shear Connectors, Threaded Studs, and Deformed Bar Anchors: Prepare steel surfaces as recommended by manufacturer of connectors, studs, or anchors. Use automatic end welding according to AWS D1.1 and manufacturer's written instructions to develop full capacities of connectors, studs, or anchors.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth where indicated or where connections will be exposed to view.
 - 3. AESS: Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances. Minimize weld show-through on exposed steel surfaces.
 - a) Grind exposed butt welds flush.
 - b) Dress exposed welds. Do not grind fillet welds without prior approval from the Structural Engineer.

2.7 SHOP PRIMING

- A. ~~Shop prime steel surfaces except the following: The following surfaces shall NOT be primed: (Addendum 3)~~
 - 1. ~~Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches. (Addendum 3)~~
 - 2. ~~Surfaces to be field welded.~~
 - 3. ~~Surfaces to be high-strength bolted with slip-critical connections.~~
 - 4. ~~Surfaces to receive sprayed fire-resistive materials.~~
 - 5. ~~Galvanized surfaces.~~
 - 6. ~~Surfaces not exposed to view upon project completion do not require primer. Exposed surfaces at project completion to be primed and painted per Section 099100. (Addendum 3)~~
- B. ~~Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:~~
 - 1. ~~SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."~~
- C. ~~Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.~~
 - 1. ~~Stripe paint corners, crevices, bolts, welds, and sharp edges.~~

- ~~2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.~~

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
 1. Fill vent holes and grind smooth after galvanizing.
 2. Galvanize all steel lintels and shelf angles located in exterior walls.
 3. Galvanize other members where specified in the drawings.
 4. Galvanize steel members exposed to the building exterior that are not scheduled to receive painted finish.

2.9 SOURCE QUALITY CONTROL

- A. Owner will engage a qualified independent testing and inspecting agency to perform shop tests and inspections and prepare test reports in accordance with IBC Chapter 17 and the Statement of Special Inspections in the General Structural Notes.
 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 2. Structural steel inspections may be waived if approved by the Owner and Building Official for work performed on the premises of a fabricator registered and approved to perform such work without special inspection in accordance with IBC Section 1704.2.2.
- B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
 1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents. At the Owner's option, the cost of additional testing performed to determine compliance of corrected work may be at the Contractor's expense.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
 - 1. Complete as-built verification prior to fabrication to the greatest extent possible to allow minor corrections, where approved by the Architect and Structural Engineer, to be made prior to field installation.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
 - 1. Erection stability procedures shall comply with OSHA Regulation 29 CFR Part 1926 Subpart R – Steel Erection, published January 18, 2001. Miscellaneous plates for guying cable attachments, temporary joist bracing, etc. shall be added as required. Contractor shall evaluate columns and provide adequate base plate shims, guys, or temporary bracing as required per OSHA section 1926.755.
 - 2. Do not remove temporary shoring supporting composite deck construction, if required, until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges." Erect AESS to one-half of standard AISC tolerance limits at canopies and sunshades. Remove exposed piece identification marks on AESS.
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required. Do not use wood wedges or wood shims. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.

2. Pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed and base or bearing plates solidly grouted.
- C. Align and adjust various members forming part of complete frame or structure before permanently fastening. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure.
- D. Splice members only where indicated.
- E. Do not use thermal cutting during erection unless approved by Architect and Structural Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for types of bolts and joints specified on the Drawings.
1. AESS: Install bolts with heads in matching orientation.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 3. Remove backing bars or runoff tabs, back gouge, and grind steel smooth where indicated or where connections will be exposed to view.
 4. AESS: Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances. Minimize weld show-through on exposed steel surfaces.
 - a) Grind exposed butt welds flush.

- b) Dress exposed welds. Fill exposed welds to a smooth profile where directed by the Architect. Do not grind fillet welds without prior approval from the Structural Engineer.
- c) At exposed connections; where erection bolts are not specified on the Drawings they shall be removed. Fill holes with plug welds and grind smooth.
- d) Remove all other field welding erection aids at exposed connections.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds, high-strength bolted connections, and erection procedures and prepare test reports in accordance with IBC Chapter 17 and the Statement of Special Inspections in the General Structural Notes.
 - 1. Provide testing agency with access to places where structural steel work is being erected to perform tests and inspections.
- B. Bolted Connections: Bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: In addition to visual inspection, field-welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents. At the Owner's option, the cost of additional testing performed to determine compliance of corrected work may be at the Contractor's expense.

3.6 COATING REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded or damaged surfaces of galvanized items and apply galvanizing repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted members and accessories.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION 051200

SECTION 052100 – STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. K-series steel joists and joist substitutes.
 - 2. Long-span steel joists.
 - 3. Joist accessories.
- B. Related Sections: The following sections contain requirements that relate to this section.
 - 1. Division 01 Section “Sustainable Requirements.”
 - 2. Division 05 Section “Structural Steel” for field quality-control procedures and tests.
 - 3. Division 05 Section “Metal Fabrications” for miscellaneous steel framing.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. SJI "Specifications:" Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders," latest edition.
- B. Joists: Refers to all items listed above in Article A, unless otherwise noted.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide joists capable of withstanding design loads indicated on the Structural Drawings.
- B. Unless otherwise indicated, design joists to withstand design loads with live load deflections no greater than the following:
 - 1. Simple Span Roof Joists: Vertical deflection of 1/360 of the span.
 - 2. Cantilevered Roof Joists or Top Chord Extensions: Vertical deflection of 1/180 of the cantilever length.
- C. Camber joists in accordance with SJI “Specifications,” unless otherwise indicated.

1.5 SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated. Include product data for primer at prime painted joists.
- B. Shop Drawings: Show layout, designation, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.
 - 1. Comprehensive structural calculations of joists signed and sealed by the qualified professional engineer responsible for their preparation shall be submitted to the Architect and Structural Engineer for review prior to joist fabrication.
 - 2. Shop drawings and structural calculations shall also be submitted to the Building Official for review as required.
- C. Manufacturer Certificates: Signed by manufacturers certifying that joists comply with requirements.
- D. Qualification Data: For manufacturer.

1.6 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standards of SJI "Specifications."
 - 1. Manufacturer's responsibilities include providing professional engineering services for designing joists to comply with performance requirements. Professional Engineer signing and sealing structural calculations shall be registered in the State of Washington.
- B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.
- B. Unfinished Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
- C. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS

- A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 FABRICATION

- A. Manufacture steel joists of type indicated according to SJI's "Specifications," with underslung ends and parallel chords, unless otherwise indicated.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Do not drill or cut holes in joist members in the field without written approval from the Structural Engineer and joist manufacturer.
- D. K-Joist Top-Chord Extensions: Extend top chords of joists with Type S or Type R top-chord extensions as indicated on Structural Drawings, complying with SJI's "Specifications." Do not substitute one type for the other unless specifically approved by the Architect and Structural Engineer.
- E. Long-Span Joist and Joist Girder Top-Chord Extensions: Extend top chords as indicated on Drawings and design for loads indicated.
- F. Provide bottom chord extensions where required for erection stability or where required to support architectural items. Coordinate stabilizer plates required at steel columns with structural steel fabricator.
- G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes or provide shim plates as required if joist or roof slope exceeds 1/4 inch per 12 inches.
- H. Shop install or design and provide installation details of all field installed web members needed to support miscellaneous point loads specified on the Structural Drawings which do not occur at joist panel points.
- I. Provide bolted bearing seat connections at or near steel columns in accordance with the General Structural Notes and in compliance with OSHA Regulation 29 CFR Part 1926

Subpart R – Steel Erection, published January 18, 2001. Coordinate bolt size and spacing with structural steel fabricator.

2.4 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability. Coordinate bridging layout with mechanical duct routing and other miscellaneous items prior to joist erection.
- B. Steel bearing plates with integral anchorages are specified in Division 5 Section "Metal Fabrications."
- C. separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.
- D. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.5 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.
- B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials or joists entirely concealed to view upon completion of the project.
- C. Apply one (1) coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.

1. Space, adjust, and align joists accurately in location before permanently fastening.
 2. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 3. Delay rigidly connecting bottom-chord extensions or kickers to columns or supports until dead loads have been applied.
- C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework where required using carbon-steel bolts.
- E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.
- B. Field welds will be visually inspected according to AWS D1.1/D1.1M.
- C. Bolted connections will be visually inspected.
- D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.
- E. Additional testing will be performed to determine compliance of corrected Work with specified requirements. At the Owner's option, the cost of additional testing performed to determine compliance of corrected work may be at the Contractor's expense.

3.4 REPAIRS AND PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 052100

dj: August 24, 2017/cpb:

SECTION 053100 – STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Roof deck.
 - 2. Composite floor deck.
- B. Related Sections include the following:
 - 1. Division 01 Section “Sustainable Requirements.”
 - 2. Division 03 Section "Cast-in-Place Concrete" for concrete fill.
 - 3. Division 05 Section "Structural Steel" for shop- and field-welded shear connectors.
 - 4. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. ICC-ES Research/Evaluation Reports: For steel deck.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. ASC Profiles, Inc.
 - 2. Verco Manufacturing Co.
 - 3. Consolidated Systems, Inc.
 - 4. Epic Metals Corporation

2.2 ROOF DECK

- A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
 - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), G60 or G90 zinc coating as indicated. Minimum yield strength as specified on Structural Drawings.
 - 2. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), G60 or G90 zinc coating as indicated; with unpainted top surface and cleaned and pretreated bottom surface primed with manufacturer's standard white or gray baked-on, rust-inhibitive primer.
 - 2. Deck Profile and Uncoated Steel Thickness: As indicated.
 - 3. Span Condition: As indicated.
 - 4. Side Laps: As indicated.

2.3 COMPOSITE FLOOR DECK

- A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), G60 or G90 zinc coating as indicated. Minimum yield strength as specified on Structural Drawings.
2. Deck Profile and Uncoated Steel Thickness: As indicated.
3. Span Condition: As indicated.
4. Side Laps: As indicated.

2.4 PREPRIMED DECKING

- A. Provide pre-primed roof or floor decking in all areas exposed to view, except non-public areas such as mechanical or electrical rooms.

2.4 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners (if used): Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws. Mechanical fasteners shall not be used as a substitution for welded/punched attachments unless specifically approved by the Structural Engineer.
- C. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 30 for overhang and slab depth.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- G. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- H. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and level recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field. Use same thickness material for flat sump plates, if used.
- I. Galvanizing Repair Paint: ASTM A 780.
- J. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring at mid-span of composite floor deck before placing concrete, if required to meet the span limitations specified on the Structural Drawings. Temporary shoring shall remain in place until concrete has reached specified 28-day strength.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks. Adjust the layout of the deck as required to ensure low flutes contact all parallel supports so attachments can be made as specified.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Reinforce openings as specified on the drawings and provide additional closure pieces as required.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF-DECK INSTALLATION

- A. Except where indicated otherwise, fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 1/2 inch, effective.
 - 2. Weld Spacing: To all supports, both parallel and perpendicular to the deck flutes, as indicated on Structural Drawings.
- B. Side-Lap Fastening: Button punch, mechanically clinch, or weld with 1-1/2-inch long top seam or side seam welds, as indicated on Structural Drawings.

- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints lapped 2 inches.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or mechanically fasten flanges to top of deck.
 - 1. Install steel angle supporting frame below in accordance with Structural Drawings.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to Drawings and deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: 1/2 inch, effective.
 - 2. Weld Spacing: To all supports, both parallel and perpendicular to the deck flutes, as indicated on Structural Drawings. Where field installed headed shear studs occur, each stud is allowed to replace one puddle weld location.
- B. Side-Lap Fastening: As indicated on Structural Drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches, with butted end joints.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck. Cut out closure pieces where they coincide with a headed shear stud placed at a deck low flute to allow concrete to fully surround the stud.
- F. Install piercing hanger tabs at 14 inches apart in both directions, within 9 inches of walls at ends, and not more than 12 inches from walls at sides, unless otherwise indicated.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field welds will be subject to inspection.

- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional testing will be performed to determine compliance of corrected Work with specified requirements. At the Owner's option, the cost of additional testing performed to determine compliance of corrected work may be at the Contractor's expense.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas of surfaces exposed to view on prime-painted deck immediately after installation, and apply repair paint.
 - 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

SECTION 054000 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior non-load-bearing wall framing.
- B. Related Sections include the following:
 - 1. Division 01 Section “Sustainable Requirements.”
 - 2. Division 05 Section "Metal Fabrications" for masonry shelf angles and connections.
 - 3. Division 07 Section “Building Insulation” for sound attenuation and thermal insulation installation.
 - 4. Division 09 Section “Gypsum Board Assemblies” for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.
 - 5. *Division 04 Section “Unit Masonry Assemblies” for mockup that requires work of this section. (Addendum 2)*
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacing, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Welding certificates.
- D. ICC-ES Research/Evaluation Reports indicating that each of the following complies with requirements:
 - 1. Cold-formed metal framing members.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.
 - 4. Screw fasteners.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who has completed cold-formed metal framing projects similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. **Welding:** Qualify procedures and personnel according to AWS D1.3, “Structural Welding Code–Sheet Steel.”
- C. **Fire-Test-Response Characteristics:** Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
- D. **AISI Specifications and Standards:** Comply with AISI’s “North American Specification for the Design of Cold-Formed Steel Structural Members” and its “Standard for Cold-Formed Steel Framing – General Provisions.”
- E. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 01 SectionL) “Project Meetings.”

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Allied Studco.
 - 2. California Expanded Metal Products Company.

3. Clark Steel Framing.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Design Shapes in Steel.
6. Dietrich Metal Framing; a Worthington Industries Company.
7. SCAFCO Corporation.
8. Steeler, Inc.
9. The Steel Network
10. United Metal Products, Inc.

- B. Manufacturer's must be members of the Steel Stud Manufacturer's Association and products must conform to ICC-ES Report No. 4943.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Type SS, G60 galvanized, of grade as follows:

1. Grade 33 for 18 and 20 gauge sections (0.033 and 0.043 mils).
2. Grade 50 for 16, 14, and 12 gauge sections (0.054, 0.068, and 0.097 mils).

- B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, G60 galvanized.

2.3 WALL FRAMING

- A. Steel Stud Sections: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated.
2. Flange Width: As indicated.

- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated.
2. Flange Width: As indicated.
3. Slotted leg deflection tracks shall be used as indicated.

- C. Vertical Deflection Clips: As indicated.

- D. Hat-Shaped, Rigid Furring Channel: Minimum metal thickness 0.0396 inches. Depth as indicated.

- E. Z-Shaped Furring: Perforated webs as indicated on drawings. Face flange leg minimum 1-1/2 inch unless otherwise indicated, wall attachment flange leg minimum 1-1/2 inch unless otherwise indicated, web depth as indicated. Minimum metal thickness 0.0516 inches.

- F. Flat Strap and Backing Plate: Steel sheet for strapping, blocking and bracing in width indicated. Minimum metal thickness 0.0396 inches.

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of specified thickness and configuration, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. Stud kickers.
 - 6. Joist hangers and end closures.
 - 7. Hole reinforcing plates.
 - 8. Backer plates.

2.5 ANCHORS AND FASTENERS

- A. Steel Shapes: ASTM A 36/A 36M.
- B. Anchor Bolts: As specified in Section 03300.
- C. Expansion Anchors: As specified in General Structural Notes.
- D. Power-Actuated Anchors: As specified in General Structural Notes.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing – General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- I. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- C. Fasten both flanges of studs to bottom track, unless otherwise indicated where clip angles are specified. Space studs as indicated on Drawings.
- D. Isolate non-load-bearing steel framing from building structure as indicated to prevent transfer of vertical loads while providing lateral support.
 1. Install deep-leg deflection tracks without slotted legs and anchor to building structure where indicated at tops of walls.
 2. Where indicated, connect vertical deflection clips to bypassing studs or to infill studs below and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced in rows indicated on Drawings. Fasten at each stud intersection.
 1. Install row of horizontal bridging within 18 inches of single deflection track at tops of walls. Alternately, temporary screws may be installed to attach each stud flange to the deflection track prior to installation of sheathing on each side of the wall. Temporary screws must be removed as sheathing is installed, and sheathing shall not be screwed into the deflection track.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.4 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Inspections are required for connections of members of the Seismic Force Resisting System, such as shear wall fastening. See the Quality Assurance Plan in the General Structural Notes for additional requirements.
- D. Testing agency will report test results promptly and in writing to Contractor and Architect.

- E. Remove and replace work where test results indicate that it does not comply with specified requirements.
- F. Additional testing will be performed to determine compliance of corrected Work with specified requirements. At the Owner's option, the cost of additional testing performed to determine compliance of corrected work may be at the Contractor's expense.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

dj: August 24, 2017/cpl/

dj: January 2, 2018

SECTION 055000 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 2. Metal roof ladders.
 3. Ships ladders
 4. Shelf angles.
 5. Loose bearing and leveling plates.
 6. Support angles for elevator door sills.
 7. Decorative interior metal panels for walls and base, window sills, jambs, and heads.
- B. Products furnished, but not installed, under this Section include the following:
1. Loose steel lintels.
 2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete.
 3. Steel weld plates and angles for casting into concrete not specified in other Sections.
- C. Related Sections:
1. Division 01 Section "Sustainable Requirements."
 2. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.
 3. Division 04 Section "Unit Masonry Assemblies" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
 4. Division 05 Section "Metal Stairs".
 5. Division 05 Section "Pipe and Tube Railings".
 6. Division 06 Section "Rough Carpentry" for metal framing anchors.
 7. Division 07 Section "Preformed Metal Siding" for perforated metal siding screen wall material.
 8. Division 07 Section "Roof Accessories" for roof hatches.
 9. Division 23 Sections for displacement ventilation grilles.
- D. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Paint products.
 - 3. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.
- D. Delegated-Design Submittal: For ladders including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For professional engineer.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
 - 4. AWS D1.6, "Structural Welding Code--Stainless Steel."

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 - 2. Provide allowance for trimming and fitting at site.

1.8 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design ladders.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- D. Slotted Channel Framing: Cold-formed metal channels with continuous slot complying with MFMA-3.
 - 1. Size of Channels: As indicated.
 - 2. Material: Steel complying with ASTM A 1008/A 1008M, structural steel, Grade 33 (Grade 230) coated with rust-inhibitive, baked-on, acrylic enamel.

2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 (ASTM F 738M) for bolts and ASTM F 594 (ASTM F 836M) for nuts, Alloy Group 1 (A1).
- D. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- G. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- J. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
- K. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

- L. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: Stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M). Structural notes on Drawings are very specific.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Paint:
 - 1. Shop Primer for Ferrous Metal: Fast-curing, lead-free, abrasion-resistant, rust-inhibitive primer selected for compatibility with substrates and with types of alkyd-type finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements only of FS TT-P-86, Types I, II and III.
 - 2. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that

maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts if units are installed after concrete is placed.
- C. Fabricate supports for operable partitions and accordion doors from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on accordion door Shop Drawings.
- D. Provide supports for overhead doors, and other suspended items as recommended by the item manufacturer. Sizes, types, and attachment of supports to structure above to conform with structural drawings and specifications.
- E. Galvanize miscellaneous framing and supports where indicated.
- F. Prime miscellaneous framing and supports with specified primer where indicated.

2.8 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3, except for elevator pit ladders.
 - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

2.9 METAL ROOF LADDERS

- A. Fabricate ladders for the locations indicated, with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of WISHA and ANSI A14.3 or Washington State Labor and Industry Standards, whichever is the most stringent. Unless otherwise indicated in drawings and details fabricate ladders as outlined below:
 - 1. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
 - 2. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
 - 3. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.
 - 4. Provide platforms as indicated fabricated from pressure-locked aluminum bar grating or extruded-aluminum plank grating, supported by extruded-aluminum framing. Limit openings in gratings to no more than 3/4 inch in least dimension.
 - 5. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted aluminum brackets.
- B. Quality Standard Manufacturer: ALACO Ladder Company, 888-310-7040, www.alcoladder.com.

1. Quality Standard Product: ALACO model 564-PRPC
- C. Alternate Acceptable Manufacturers: Equivalent products from the following manufacturers may be provided:
 1. FS Industries, 800-421-0314, www.fsindustries.com
 2. Precision Ladders, LLC, 800-225-7814, www.precisionladders.com

2.10 METAL SHIPS LADDERS

- A. Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
 1. Treads shall be not less than 5 inches exclusive of nosing or less than 8-1/2 inches including the nosing, and riser height shall be not more than 9-1/2 inches.
 2. Fabricate ships' ladders, including railings from aluminum.
 3. Fabricate treads from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 1/2 inch in least dimension.
 4. Comply with applicable railing requirements in Division 05 Section "Pipe and Tube Railings."
- B. Quality Standard Manufacturer: ALACO Ladder Company, 888-310-7040, www.alcoladder.com.
 1. Quality Standard Product: ALACO model H1000-60
- C. Alternate Acceptable Manufacturers: Equivalent products from the following manufacturers may be provided:
 1. FS Industries, 800-421-0314, www.fsindustries.com
 2. Precision Ladders, LLC, 800-225-7814, www.precisionladders.com

2.11 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B. Galvanize loose steel lintels located in exterior walls.

2.12 SHELF ANGLES

- A. Galvanize shelf angles located in exterior walls.

2.13 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.14 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

2.15 SUPPORT ANGLE FOR ELEVATOR DOOR SILLS

- A. Fabricate from steel material of size as required.

2.16 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime interior miscellaneous steel trim, where indicated with zinc-rich primer.

2.17 DECORATIVE INTERIOR METAL PANELS

- A. Material: 3/32" hot rolled steel plate.
- B. Finish: Clear wax finish by Sculpt Nouveau.
- C. Fabrication: Mount wall panels to plywood backing. Pre-drill for screws per pattern indicated on drawings.
- D. Source: Pivot Fabrication, 6501 East Marginal Way, Suite C, Seattle, Washington. Phone 206-762-3755. Email Ty Swanson ty@pivotmetal.com.

2.18 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

2.19 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
1. Exteriors (SSPC Zone 1B) SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLING DECORATIVE METAL PANELS

- A. General: Install prefabricated metal panels per fabricator's written instructions and requirements indicated on Shop Drawings.
 - 1. Install so edges abut cleanly with no exposure of plywood backing.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 055100 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preassembled steel stairs with concrete filled pan treads and landings.
 - 2. Preassembled steel stairs with metal plate treads, risers, landings and guardrails.
- B. Related Sections include the following:
 - 1. Division 05 Section "Metal Fabrications" for steel flat bar stock and steel plate for guardrails.
 - 2. Division 05 Section "Pipe and Tube Railings" for pipe and tube railings not attached to metal stairs or to walls adjacent to metal stairs.
 - 3. Division 07 Section "Formed *Metal (Addendum 1)* Wall Panels" for perforated metal panel guardrails attached to metal stairs.
 - 4. Division 09 Section "Painting" for surface preparation and coatings.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For metal stairs and the following:
 - 1. Shop Drawings: Refer to the General Structural Notes and the structural drawings. Show fabrication and installation details for metal stairs including precast concrete components. Include plans, elevations, sections and details of metal stairs and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Sample: Provide full scale sample of complete metal plate tread, riser, and stringer assembly showing material, texture, shop coating and fabrication.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.

- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform Load: 100 lbf/sq. ft.
 - 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 - 5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.
- B. Seismic Performance: Provide metal stairs capable of withstanding the effects of earthquake motions determined according to the International Building Code. See General Structural notes for criteria.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Arrange for metal stairs specified in this Section to be fabricated and installed by the same firm.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal stairs (including handrails and railing systems) that are similar to those indicated for this Project in material, design, and extent.
- C. Design Intent: Work shall conform to applicable provisions of NFPA 101 and ADA requirements. Assembly shall provide concrete filled treads and landings.
- D. Fabricator Qualifications: A firm experienced in producing metal stairs similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

1.7 COORDINATION

- A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts,

and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Preassembled Stairs:
 - 1. Al's Welding and Steel Fabrication, Inc.
 - 2. Alfab, Inc.
 - 3. American Metal Works, Inc.
 - 4. American Stair Corp., Inc.
 - 5. Sharon Stairs.
 - 6. Pacific Stair Corporation.

2.2 FERROUS METALS

- A. Metal Surfaces, General: Provide metal free from pitting, seam marks, roller marks and other imperfections where exposed to view on finished units. Do not use steel sheet with variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- D. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- E. Uncoated, Cold-Rolled Steel Sheet: Commercial quality, complying with ASTM A 366/A 366M; or structural quality, complying with ASTM A 611, Grade A, unless another grade is required by design loads.
- F. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 FASTENERS

- A. General: Provide fasteners sufficient to secure work and carry all applicable loads.

2.4 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems

indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, handrails, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
- B. Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
- C. Join components by welding, unless otherwise indicated.
- D. NAAMM Stair Standard: Comply with “Recommended Voluntary Minimum Standards for Fixed Metal Stairs” in NAAMM AMP 510, “Metal Stairs Manual,” for class of stair designated, unless more stringent requirements are indicated.
- E. Commercial class, unless otherwise indicated.
- F. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Shear and punch metals cleanly and accurately. Remove sharp or rough areas on exposed surfaces.
- G. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- H. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - 6. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
 - 7. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

- A. Stair Framing: Fabricate stringers of structural-steel channels, tubes, plates, or a combination of both, as indicated. Provide closures for exposed ends of stringers.

Construct platforms of structural-steel tube steel headers and miscellaneous framing members as indicated. Bolt or weld headers to stringers; bolt or weld framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.

- B. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

2.7 ABRASIVE NOSINGS AT CONCRETE FILLED PAN TREADS

- A. Extruded Units: Aluminum units with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
 - 1. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusion.
 - 2. Quality Standard Product: Aamstep model 210A.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Apply clear lacquer to concealed surfaces of extruded units set into concrete.

2.8 METAL PLATE TREADS AND LANDINGS

- A. Fabricate metal plate treads and landings from 11 gauge ASTM A36 carbon steel with non-skid texture with a 0.025 inch deposit height, minimum 1,000 deposits per square foot. Treads to have integral nosing with 90 degree bend.
 - 1. Quality Standard Product: ALGRIP slip-resistant metal stair treads and nosings.

2.9 FINISHES

- A. Comply with NAAMM'S "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal stairs after assembly.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed products:
 - 1. Exteriors and Interiors: SSPC SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Apply shop primer to prepared surfaces of metal stair components, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
- E. Stripe paint corners, crevices, bolts, welds, and sharp edges.

- F. Painting: Apply paint coatings specified for ferrous metal.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PAÿ1 for touching up shop-painted surfaces.
- B. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."

END OF SECTION 055100

SECTION 055213 – PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Steel pipe and tube railings.
- B. Related Sections include the following:
 - 1. Division 05 Section "Metal Stairs" for metal stairs.
 - 2. Division 05 Section "Metal Fabrications" for steel flat bar stock and steel plate for guardrails.
 - 3. Division 06 Section "Rough Carpentry" for wood blocking for anchoring railings.
 - 4. Division 09 Section "Painting" for painting of railings.

1.3 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1. Steel: 72 percent of minimum yield strength.
- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 - 2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.2 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed).
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Castings: Either gray or malleable iron, unless otherwise indicated.
 1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
 2. Malleable Iron: ASTM A 47/A 47M.

2.3 FASTENERS

- A. General: Provide the following:
 1. Steel Railings: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
 2. Stainless Steel Railings: Provide stainless steel Type 304 hardware and fasteners where painted finish is not indicated on the Drawings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 2. Provide square or hex socket flat-head machine screws for exposed fasteners, unless otherwise indicated.
- D. Anchors: Provide cast-in-place or post installed anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.5 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces. Where necessary, field weld sections of railings to structural uprights at catwalks.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- F. Connections: Fabricate railings with either welded or nonwelded connections, unless otherwise indicated.
- G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- H. Form changes in direction as follows:
 - 1. As detailed.
 - 2. By bending or by inserting prefabricated elbow fittings.

- I. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- J. Close exposed ends of railing members with prefabricated end fittings.
- K. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
- L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. For railing posts set in concrete, provide steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with steel plate forming bottom closure.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.7 STEEL AND IRON FINISHES

- A. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. Galvanized Railings:

1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
- C. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- D. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- E. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.
- F. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- G. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Do not apply primer to galvanized surfaces.
 2. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- H. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.
1. Color: Match Architect's sample.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).
- C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.
1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Use type of bracket with predrilled hole for exposed bolt anchorage.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 2. For steel-framed gypsum board partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

3.6 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

SECTION 06100 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fire retardant treated wood blocking and nailers.
 - 2. Fire retardant treated framing with dimensional lumber.
 - 3. Fire retardant treated plywood backing panels.
 - 4. *Reinforced Cement Panels for protection of exterior foundation insulation. (Addendum 3)*
- B. Related Sections include the following:
 - 1. Division 01 “Sustainable Requirements.”
 - 2. Division 06 Section "Finish Carpentry" for surface applied wood trim that requires concealed wood blocking for attachment.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. RIS: Redwood Inspection Service.
 - 3. SPIB: The Southern Pine Inspection Bureau.
 - 4. WCLIB: West Coast Lumber Inspection Bureau.
 - 5. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Wood-preservative-treated wood.
 2. Metal framing anchors.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets indicating the bonding agents used for each composite wood and agrifiber product used in the project and demonstrating that no added urea formaldehyde resins are used in these products

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 LEED REQUIREMENTS

- A. Composite door, solid core doors, interior plywood, millwork, cabinetry, crown molding, counters, wood panel products used on the interior of the building shall contain no added urea-formaldehyde resins.
- B. Adhesives used in field and shop-fabricated assemblies containing these composite wood products shall contain no added urea-formaldehyde resins.

2.3 ADHESIVES, SEALANTS, PAINTS AND COATINGS

- A. Refer to VOC limit tables in Division 01 Section "Indoor Air Quality Requirements" for VOC limits for products in this section

2.4 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Lumber and Plywood Preservative Treatment by Pressure Process: All above ground lumber and plywood shall be pressure treated using AWPAs Use Categories NC2 for interior use, NC3B for exterior use when not in contact with the ground and NC4A for exterior use with ground contact.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.5 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in the following AWPA Use Categories:
 1. Use Category UCFA: For lumber and plywood used in interior construction where wood material is not in contact with the ground and is protected from exterior weather.
 2. Use Category UCFB: Wood and wood based materials in exterior construction that is not in contact with the ground or with foundations, but may be exposed to full effects of weather.
- B. Exterior type is suitable for both exterior and interior applications. Interior type is only for interior applications. See Evaluations.
- C. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- E. Application: Treat items indicated on Drawings and/or required by building code to be fire retardant treated.

2.6 DIMENSION LUMBER FRAMING

- A. Lumber, General: Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by W.C.L.B., for the moisture content specified for each use.
 1. Provide dressed lumber, S4S, unless otherwise shown or specified.
 2. Provide seasoned lumber with 15% maximum moisture content at time of dressing.
- B. All wood blocking, tip plates, etc., shall be pressure treated. Any cuts shall be coated with a brush application of specified preservative.
- C. Framing Lumber (2" through 4" thick)" For light framing (less than 6" wide), provide the following grade and species:
 1. No. 2 grade, blocking, curbs, and insulation stops
 2. Species: Hem-Fir, Fb=1150 p.s.i.

3. Maximum Moisture Content: 19 percent.

2.7 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Nailers.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
 1. Mixed southern pine, No. 2 grade; SPIB.
 2. Hem-fir or hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
 3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
 4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.8 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.9 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.

- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.10 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
 - 1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable authorities having jurisdiction and that evidence of compliance of metal framing anchors for application indicated with building code in effect for Project.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, (Class G185 coating designation).
 - 1. Use for interior locations where stainless steel is not indicated.

2.11 MISCELLANEOUS MATERIALS

- A. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

2.12 REINFORCED CONCRETE PANELS *(Addendum 3)*

- A. *General: Non-combustible, and rot-proof Portland cement panels reinforced with synthetic fibers.*
- B. *Panel Properties: Density of 0.054 per cubic inch.*

1. *Impact Resistance: ASTM D 1037 passed.*
 2. *Surface Burning Characteristics: ASTM E 84 Flame spread – 0, Smoke developed – 0.*
 3. *Water Absorption: ASTM C 1185, less than 30%*
- C. *Design Standard Product: Finex panels, distributed and fabricated by Foundry Service and Supplies, 909-284-5000, www.foundryservice.com*

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- C. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, trim, and manufactured wood casework.
1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- D. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
- F. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- G. Use corrosion resistant nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD SLEEPER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PLYWOOD BACKING PANEL INSTALLATION

- A. Install fire treated plywood backing panels with stamped fire rating certification in clear view on each individual sheet when installation is completed.

3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

3.5 *REINFORCED CONCRETE PANELS (Addendum 3)*

- A. *Follow manufacturer's published instructions.*
- B. *Install panels 12 inches below ground level and fasten every 24 inches along the width and height of the panels.*
- C. *Drill holes using a bit with a diameter 1/16 inch larger than the diameter of the screws. Fasteners must penetrate at least 3/4 inch into the concrete.*
- D. *Leave a minimum space of 1/8 inch between panels for expansion. If a flexible adhesive sealant is used, leave a minimum space of 1/4 inch. Sealing of the joints is not required.*
- E. *Use flashing to cover the screws on the top part of the panels. Use backfill to cover all other screws.*

END OF SECTION 06100

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes:

1. Plywood wall sheathing.

- B. Related Sections include the following:

1. Division 01 "Sustainable Requirements."
2. Division 06 Section "Rough Carpentry" for wood framing and plywood backing panels.
3. Division 07 Section "Weather Barriers" for water-resistive barrier applied over wall sheathing.
4. Division 07 Section "Thermoplastic Membrane Roofing" for cover board.
5. Division 07 Section "Building Insulation" for composite insulation board.
6. Division 09 Section "Gypsum Board Assemblies" for interior sheathing including gypsum wallboard.
7. Division 09 Section "Ceramic Tile" for tile backer board.
8. *Division 04 Section "Unit Masonry Assemblies" for mockup that requires work of this section. (Addendum 2)*

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

- B. Evaluation Reports: For following products, from ICC-ES:

1. Wood-preservative treated plywood.
2. Fire-retardant-treated plywood
3. Foam-plastic sheathing.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.

- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets indicating the bonding agents used for each composite wood and agrifiber product used in the project and demonstrating that no added urea formaldehyde resins are used in these products

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

2.2 LEED REQUIREMENTS

- A. Composite door, solid core doors, interior plywood, millwork, cabinetry, crown molding, counters, wood panel products used on the interior of the building shall contain no added urea-formaldehyde resins.
- B. Adhesives used in field and shop-fabricated assemblies containing these composite wood products shall contain no added urea-formaldehyde resins.

2.3 ADHESIVES, SEALANTS, PAINTS AND COATINGS

- A. Refer to VOC limit tables in Division 01 Section "Indoor Air Quality Requirements" for VOC limits for products in this section

2.4 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 PRESERVATIVE-TREATED PLYWOOD

- A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177 Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.6 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 - 3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified.

- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings.
- F. Locations: Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.7 WALL SHEATHING

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exposure 1 sheathing.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1 sheathing.

2.8 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
 - 3. ICC-ES evaluation report for fastener.
- D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

END OF SECTION 061600

dj\August 23, 2017 cpl\

dj: January 2, 2018

SECTION 062000 – FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hardwood veneer plywood panels for ceilings and walls.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 “Sustainable Requirements.”
 - 2. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Finish carpentry includes carpentry work which is exposed to view, is non-structural, and which is not specified as part of other Sections.
- B. Inspection agencies, and the abbreviations used to reference them, include the following:
 - 1. AWI – Architectural Woodwork Institute
 - 2. HPVA – Hardwood Plywood Veneer Association

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Include construction details, material descriptions, and dimensions of individual components including profiles, textures, and colors.
- B. Samples for Verification:
 - 1. For each finish system and color of panel products with factory-applied finish, provide 3 inch square sample.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.

- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets indicating the bonding agents used for each composite wood and agrifiber product used in the project and demonstrating that no added urea formaldehyde resins are used in these products.

1.6 QUALITY ASSURANCE

- A. Submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.
- B. Quality Standard: Comply with AWI AWS for grades of architectural woodwork, construction, finishes, and other requirements. Provide AWI certification labels or AWI certificates of compliance indicating that woodwork meets requirements of grades specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
- B. Do not deliver interior finish carpentry until environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels through the remainder of construction period.

PART 2 - PRODUCTS

2.1 MATERIAL, GENERAL

- A. Woodworking Standard: Where indicated for a specific product comply with specified provision of the following:

1. Architectural Woodwork Standards (AWS) latest edition: Custom.

B. Hardwood Plywood: HPVA-HP1.

2.2 LEED REQUIREMENTS

A. Composite door, solid core doors, interior plywood, millwork, cabinetry, crown molding, counters, wood panel products used on the interior of the building shall contain no added urea-formaldehyde resins.

B. Adhesives used in field and shop-fabricated assemblies containing these composite wood products shall contain no added urea-formaldehyde resins.

2.3 ADHESIVES, SEALANTS, PAINTS AND COATINGS

A. Refer to VOC limit tables in Division 01 Section "Indoor Air Quality Requirements" for VOC limits for products in this section

2.4 FINISH CARPENTRY

A. Hardwood Veneer Plywood (Wall and Ceiling Panels): Provide Hardwood Veneer pMDI Core Plywood with no added formaldehyde;

B. Quality Standard Product: PureBond process domestic veneer core hardwood plywood as manufactured by Columbia Forest Products, www.cfpwood.com.

1. Core Construction: Polymeric diphenylmethane diisocyanate (pMDI) MDF bonded crossbands.
2. Thickness: 5-ply 12mm.
3. Face Veneer: Grade A White Maple.
4. Back Veneer: Grade 2.
5. Cut: Plain Sliced.
6. Finish: Transparent. AWI Finish System #TR-6 (catalyzed polyurethane). Stain to match Architect's approved sample.

C. Perforated Hardwood Veneer Plywood (ceiling panel)

1. Same as above with drilled perforations.

- a. Pattern: Round
- b. Hole Size: 1/4 inch
- c. Staggered Centers: 5/8 inch
- d. Transparency: 23% open
- e. 2" solid edge

D. Perforated Hardwood Veneer Plywood (stair screen panel)

1. Same as above with drilled perforations in custom pattern.
2. Thickness: 7-ply 18mm.

- a. Pattern: Round
- b. Hole Size: 1/2 inch
- c. Staggered Centers: Varies, see plans.
- d. Transparency: Varies, see plans.
- e. 2" solid edge.
- f. Pre-adhesive matching edge band at all exposed edges.

3. Submittal: Provide full-size (full panel) mock-up of perforated panel for review by Architect prior to beginning installation.

2.5 Miscellaneous Materials

- A. Fasteners and Anchorages: Provide nails, screws and other anchoring devices of the type, size, material and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.
 1. Quality Standard Product for wall panel clips: Monarch aluminum lift off clip model No. MF-375. Monarch Metal Fabrication. www.monarchmetal.com.
 2. Quality Standard Product for ceiling panel clips: Star Hanger Systems aluminum ceiling clip. www.starhanger.com.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Condition finish carpentry to average prevailing humidity conditions in installation areas before installation, for a minimum of 48 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use finish carpentry materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install finish carpentry plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.

1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
2. Install to tolerance of 1/8 inch in 96 inches for plumb and level. Install adjoining finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
3. Coordinate finish carpentry with materials and systems in or adjacent to standing and running trim and rails. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.

3.4 HARDWOOD VENEER PANEL INSTALLATION

- A. Install in accordance with reviewed product data, final shop drawings, manufacturer's written recommendations, and as indicated on the Drawings.
- B. Install architectural woodwork to comply with AWI AWS for the same grades specified in Part 2 Products of this Section for type of architectural woodwork involved.
- C. Installation Tolerances: Install architectural woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims.

3.5 ADJUSTING

- A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.7 PROTECTION

- A. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 062000

SECTION 064023- ARCHITECTURAL CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Stock factory built casework and countertops.
- 2. Custom fabricated casework and countertops
- 3. Closet and utility shelving
- 4. Cabinet hardware and locks
- 5. Miscellaneous hardware

- B. Related Requirements:

- 1. Division 01 "Sustainable Requirements."
- 2. Division 06 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 PRODUCTS

- A. Fabricators to be AWI certified

- B. Wood Casework:

- 1. Materials: Solid wood, plywood, and MDF panels.
- 2. Finish: Plastic laminate, wood veneers and specialty metals

- C. Countertops:

- 1. Material: Solid Surfacing.

- D. Wood Products:

- 1. Softwood Plywood: DOC PS 1, Medium Density Overlay.
- 2. Hardwood Plywood and Face Veneers: HPVA HP-1.
- 3. Particleboard: Straw-based complying with ANSI A208.1, Grade M2
- 4. Veneer-faced Panel Products: HPVA HP-1, made with adhesive containing no urea formaldehyde.

5. Medium Density Fiberboard (MDF): Provide ANST/AHA A135.4 Hi-impact, smooth single side
 6. Trim wood for stain: Premium grade hardwood, oak or maple
 7. Trim for opaque finishes: Custom grade hardwood
- E. Thermoset Decorative Panels: Particleboard or MDF finished with fused melamine-impregnated decorative paper per LMA SAT-1.
- F. High Pressure Decorative Laminate: NEMA LD 3
- G. Chemical Resistant High Pressure Laminate: NEMA LD 3, Grade HGP
- H. Clear Tempered Float Glass for Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.
- I. Cabinet Hardware: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

1.4 SUBMITTALS

- A. Product Data: For each product specified as work of this section and incorporated into items of architectural woodwork, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate solid-surfacing material fire-retardant-treated materials cabinet hardware and accessories and finishing materials and processes.
- B. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. Drawings shall be complete, with full cross-references between drawings. Reproductions of contract documents in any form will not be accepted.
1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 2. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers and other items installed in architectural woodwork.
 3. Apply AWI Quality Certification Program label to Shop Drawings.
- D. Samples for Verification:
1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge. Show top, front edge and backsplash conditions.
 2. Solid-surfacing materials, 6 inches square, including sample seams and backsplash.
 3. Stainless steel countertop, 8 by 10 inches, with sample applied to core material. Show top, front edge and backsplash conditions.

- E. Exposed cabinet hardware and accessories, one unit for each type and finish. Product Certificates: For each type of product, signed by product manufacturer.
- F. Woodwork Quality Standard Compliance Certificates: ~~AWI Quality Certification Program certificates.~~ *Membership. (Addendum 2)*
- G. Qualification Data: For Installer and fabricator.
- H. Warranty: Sample of special warranty.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets indicating the bonding agents used for each composite wood and agrifiber product used in the project and demonstrating that no added urea formaldehyde resins are used in these products.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Installer shall be factory trained installers employed by the manufacturer with experience in successfully installing casework of type indicated for this project, and also employing competent control personnel to conduct effective quality control to ensure compliance with quality installation requirements.
 - 1. List of all completed installations in the last 2 years, including:
 - a. Project Name and Location.
 - b. Name of General Contractor and phone number.
 - c. Name of Owner and phone number.
 - d. Name of the Architect and phone number.

- C. Indoor Air Quality: All particleboard shall comply with the U.S. Department of Housing and Urban Development (HUD) Standard 24 Part 3280 (related to the use of pressed wood products in manufactured homes). Particleboard should also meet this HUD Standard and comply with the National Particle Board Association Voluntary Standard for Formaldehyde Emissions (FPA-987).
- D. Source Limitations: Obtain interior architectural woodwork from single source from single manufacturer.
- E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver casework until painting and similar operations that could damage casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where casework is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of manufactured casework that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of components or other failures of glue bond.
 - b. Warping, twisting or sagging of components.

- c. Failure of operating hardware.
- d. Deterioration of finishes.

2. Warranty Period: Five years from date of Substantial Completion.

1.10 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural casework can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 LEED REQUIREMENTS

- A. Composite door, solid core doors, interior plywood, millwork, cabinetry, crown molding, counters, wood panel products used on the interior of the building shall contain no added urea-formaldehyde resins.
- B. Adhesives used in field and shop-fabricated assemblies containing these composite wood products shall contain no added urea-formaldehyde resins.

2.2 CASEWORK FABRICATORS

- A. Available Fabricators: Subject to compliance with requirements, fabricators offering interior architectural casework that may be incorporated into the Work include, but are not limited to, the following:
 - 1. ~~Westmark~~ *Frontier Door & Cabinet (Addendum 1)*
 - 2. Custom Source Caseworking (CSW)
 - 3. ~~Lemons~~ *Millwork (Addendum 1)*
 - 4. Pacific Cabinets
 - 5. *Genothen (Addendum 2)*

2.3 ADHESIVES, SEALANTS, PAINTS AND COATINGS

- A. Refer to VOC limit tables in Division 01 Section "Indoor Air Quality Requirements" for VOC limits for products in this section

2.4 MATERIALS

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of casework and quality grade specified, unless otherwise indicated.
- B. Thermoset Decorative Overlay: Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

- C. Clear Tempered Float Glass for Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by casework quality standard.
- E. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
- F. Adhesive for Bonding Plastic Laminate: PVA.
- G. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without a precoated finish.
- H. Stainless Steel for Countertops: ASTM A240 316 Grade stainless steel, 18 gauge, No. 4 finish.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware"
- B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
- C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening
- D. Wire Pulls: Back mounted, 4 inches long, 5/16 inches in diameter.
- E. Catches: Push-in magnetic catches, BHMA A156.9, B03131.
- F. Manual Latches: Provide manufacturer's standard manual latches at leaf without lock at all upper and lower cabinets with paired leaves, nickel plated.
- G. Adjustable Shelf Standards and Supports: Knappe and Vogt #255 recessed shelf standard with Knappe & Vogt #256 adjustable shelf clips. Provide four standards for shelves less than 18 inches deep and six standards for shelves 18 inches deep and deeper.
- H. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:
 - 1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
 - 2. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
 - 3. File Drawer Slides: Grade 1HD-200; for drawers more than 6 inches high or 24 inches wide.

4. Pencil Drawer Slides: Grade 1; for drawers not more than 3 inches high and 24 inches wide.
 5. Keyboard Slides: Grade 1HD-100; for computer keyboard shelves.
- I. Door Locks: BHMA A156.11, E07121. Provide Olympus Lock 754LC Series using a Sargent No. 11-C480-2 cylinder with keying to match building keying system. Provide spaces and cams as required. Each lock to have metal tumblers and metal strike plate. Locks to have a 26D finish.
 - J. Drawer Locks: BHMA A156.11, E07041. Provide Olympus Lock 854LC Series using a Sargent No. 11-C480-2 cylinder with keying to match building keying system. Provide spaces and cams as required. Each lock to have metal tumblers and metal strike plate. Locks to have a 26D finish.
 - K. Grommets for Cable Passage through Countertops: 2-inch OD, brown, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for finish indicated.
 1. Brushed chrome finish: Satin, brushed steel finish (US 26D and/or US 36D, as applicable).
 - M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 INSTALLATION MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.7 FABRICATION, GENERAL

- A. Interior Casework Grade: Provide Custom grade interior casework complying with the referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate casework to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.

2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
 3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch.
- D. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- E. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
1. Seal edges of openings in countertops with a coat of varnish.
- F. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets

2.8 PLASTIC-LAMINATE CABINETS

- A. Quality Standard: Comply with AWI Section 400 Custom grade for requirements for laminate cabinets.
1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
- B. AWI Type of Cabinet Construction: Flush overlay.
- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
1. Horizontal Surfaces Other Than Tops: Grade HGS.
 2. Vertical Surfaces: Grade VGS.
 3. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
- D. Materials for Semi-exposed Surfaces: Provide surface materials indicated below:
1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS
 2. Edges of Plastic-Laminate Shelves (except where exposed surface): PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
 3. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.
 4. Drawer Sides and Backs: Thermoset decorative panels.
 5. Drawer Bottoms: Thermoset decorative panels.

- E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.
- F. Core Material:
 - 1. Doors: 11/16" particleboard
 - 2. Drawer:
 - a. Fronts: 11/16" particleboard
 - b. Sides and back: 5/8" exterior plywood
 - c. Bottom: 1/2" particleboard. Reinforce bottoms over 30" wide.
 - 3. Cabinet ends: 3/4" particleboard
 - 4. Cabinet top and bottom: 3/4" particleboard
 - 5. Backs: 11/16" particleboard
 - 6. Adjustable and fixed shelves:
 - a. Less than 24" long: 3/4" particleboard
 - b. 24" to 30" long: 1" particleboard
 - c. 30" to 48" long: 1" plywood
 - 7. Scribes and fillers: 11/16" particleboard
 - 8. Bases: 3/4" exterior plywood
- G. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Match Architect's sample.

2.9 PLASTIC-LAMINATE SHELVING

- A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate shelves.
- B. High-Pressure Decorative Laminate Grade: HGS.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
- D. As scheduled in the drawings.
- E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- F. Core Material: Plywood.

2.10 PLASTIC-LAMINATE-CLAD-COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 400 requirements for countertops.
- B. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of plastic laminate material complying with the following requirements:
 - 1. As scheduled in the drawings.
- D. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- E. Core Material: As selected by fabricator to comply with quality standard.
- F. Core Material at Sinks: Exterior-grade plywood.
- G. Core Thickness: 3/4 inch
- H. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.11 SOLID-SURFACING-MATERIAL COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 400 requirements for countertops.
- B. Solid-Surfacing-Material Thickness: 1/2 inch
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:
 - 1. As scheduled in the drawings.
- D. Fabricate tops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
- E. Drill holes in countertops for plumbing fittings and soap dispensers in shop.

2.12 STAINLESS STEEL COUNTERTOPS

- A. Material: ASTM A240 316 Grade stainless steel, 18 gauge, No. 4 finish
- B. Methods: All factory welds shall be made using the TIG process. Filler rod shall be of the same composition as the base material.
- C. Tops: Form tops with 1.25" high edges with 0.5" return flange. Marine edges shall be integrally formed on all edges. Marine edges shall be 1" wide and 0.25" high. Work surface shall be reinforced with wood core as required. Form edges, flanges and backsplashes integrally from one sheet of steel. Intersections between backsplashes and work surface shall be radiused a minimum of 0.375".
- D. Sink Bowls: Sink bowls shall be made of the same material as the work surface and shall be of equal or greater thickness. Sinks bowls shall be formed from one piece of steel with all inside corners radiused. Welds shall be hammered, ground and polished to

produce a smooth, invisible joint. Sinks shall be welded into the work surface and welds shall be ground and polished to produce a smooth, invisible joint.

- E. Joints: Factory welds shall be ground and polished to provide an invisible joint. Field connections shall be mechanical “tongue and groove” interlocking design with concealed bolts to provide a hairline seam.
- F. Sound Deadener: Countertops and sinks shall have sound deadening material applied as required to the underside. Nominal thickness shall be 0.062”. Sound deadener shall be waterborne, non-flammable and shall contain no volatile organic compounds.

2.13 SHOP FINISHING

- A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
 - 1. Grade: Provide finishes of same grades as items to be finished.
- B. General: The entire finish of interior architectural casework is specified in this Section, regardless of whether shop applied or applied after installation. The extent to which the final finish is applied at fabrication shop is Contractor's option, except shop apply at least the prime coat before delivery.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural casework, as applicable to each unit of work.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition casework to average prevailing humidity conditions in installation areas before installation.
- B. Before installing architectural casework, examine shop-fabricated work for completion and complete work as required, including removal of packing and back-priming.
- C. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of manufactured wood casework.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Quality Standard: Install casework to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of casework involved.
- B. Install casework level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

- C. Scribe and cut casework to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Anchor casework to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with casework and matching final finish if transparent finish is indicated.
- E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
 - 2. Install wall railings on indicated metal brackets securely fastened to wall framing.
 - 3. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 2. Maintain veneer sequence matching of cabinets with transparent finish.
 - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish
- G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 3. Secure backsplashes to walls with adhesive.
 - 4. Caulk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."
 - 5. At service counters, undermount bracket to be Lift Assist Damper by Sagutsune
- H. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be

joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
 - I. Provide filler panels at tops of wall-mounted and tall cabinet units to fill gaps between cabinets and walls.
 - J. Complete the finishing work specified in this Section to extent not completed at shop or before installation of casework. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective casework, where possible, to eliminate functional and visual defects; where not possible to repair, replace casework. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean casework on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
- D. Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures cabinets being without damage or deterioration at time of substantial completion.

END OF SECTION 064023

SECTION 071113 – BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Cold-applied, emulsified-asphalt dampproofing.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.
- B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.1 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved:
 - 1. Sonneborn Brand Products.
 - 2. Karnak Corporation.
 - 3. Koppers, Inc.
 - 4. Meadows, W. R., Inc.
 - 5. Deco Products, Inc.; Deco 20 Dampproofing
- B. Trowel Coats: ASTM D 1227, Type II, Class 1.
- C. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

- D. VOC Content: 0.25 lb/gal. (30 g/L) or less.
- E. Low-Emitting Materials: Dampproofing used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 PROTECTION COURSE

- A. Protection Course, Asphalt-Board Type: ASTM D 6506, premolded, 1/8-inch (3-mm) thick, multi-ply, semi-rigid board consisting of a mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, and faced on one side with polyethylene film.

2.3 MISCELLANEOUS MATERIALS

- A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.
 - 1. Primer used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- C. Patching Compound: Epoxy or latex-modified repair mortar or manufacturer's fibered mastic of type recommended by dampproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
 - 1. Proceed with dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.
 - 2. Test for surface moisture according to ASTM D 4263.

3.2 PREPARATION

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

- C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
 - 1. Apply additional coats if recommended by manufacturer or if required to achieve coverages indicated.
 - 2. For drying time between coats and drying time prior to back-filling, follow the recommendations of the manufacturer.
- B. Apply dampproofing to perimeter footings and foundation walls where opposite side of wall faces building interior or where interior walls face occupied space.
 - 1. Apply from finished-grade line to top of footing, extend over top of footing, and down to bottom of footing.
 - 2. Extend 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 3. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8 inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.
- C. Apply dampproofing to non-galvanized steel columns, pipe bollards, and other miscellaneous steel items which are partially installed below floor slab level or below grade or where indicated on drawings. Apply to all surfaces below top of slabs and below grade and protect all exposed surfaces from dampproofing material. Where concrete slabs are being poured around vertical steel surfaces, wrap steel with flexible covering to protect dampproofing from concrete material.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. On Concrete Foundations: Apply 2 brush or spray coats at not less than 2 gal./100 sq. ft. for each coat.

3.5 INSTALLATION OF PROTECTION COURSE

- A. Where indicated, install protection course over completed and cured dampproofing. Comply with dampproofing material manufacturers written instructions for attaching protection course.
 - 1. Support protection course with spot application of adhesive of type recommended by protection board manufacturer over cured coating.
 - 2. Install protection board course within 24 hours of installation of dampproofing (while coating is tacky) to ensure adhesion.

3.6 CLEANING

- A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 071113

SECTION 071115 - SHEET WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Extent of sheet waterproofing is to be the full area of all retaining walls that separate earth from interior building area (any location where the grade on one side of the wall is higher than finished floor level on the other side. Extend sheet waterproofing system from top of retaining wall to bottom of footing.
- B. Type of sheet waterproofing specified in this section:
 - 1. Rubberized asphalt sheet waterproofing.
 - a. To be applied to foundation and retaining walls with occupied interior space within them at their level, including but not limited to elevator pit.

1.3 SYSTEM PERFORMANCE

- A. Provide sheet waterproofing products which have been produced and installed to establish and maintain watertight continuous seals.

1.4 SUBMITTALS

- A. Product Data: Submit product data and general recommendations from waterproofing materials manufacturer, for type of waterproofing required. Include data substantiating that materials comply with requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Obtain primary waterproofing materials of each type required from a single manufacturer, to greatest extent possible. Provide secondary materials only as recommended by manufacturer of primary materials.
- B. Installer: Firm with not less than three years of successful experience in installation of waterproofing similar to requirements for this project and which is acceptable to manufacturer of primary waterproofing materials.

1.6 JOB CONDITIONS

- A. Substrate: Proceed with work after substrate construction, openings, and penetrating work have been completed.

- B. Weather: Proceed with waterproofing and associated work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide sheet waterproofing materials complying with required performance. Other similar materials certified in writing to be equal to or better than specified may be used if acceptable to Architect.
- B. Basis of Design Product: The design for the sheet waterproofing is based on "Grace Construction Products," Bituthene 3000 with Dydroduct 220 Drainage Composite. Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved:
1. Mel-Rol; W.R. Meadows Inc. Check
 2. Plastiwrap 60; Progress Unlimited Inc. Check
 3. Carlisle MiraDri 860/861 & MiraDrain 6000/6200 (*Addendum 1*)

2.2 *PRE-APPLIED WATERPROOFING (Addendum 1)*

- A. *Basis of Design Product: The design for the pre-applied waterproofing is based on Grace Construction Products, "Preprufe 300R Plus". Subject to compliance with requirements, provide the named product or approved comparable product.*

2.3 RUBBERIZED ASPHALT SHEET WATERPROOFING

- A. Self-adhering membrane of rubberized asphalt integrally bonded to cross laminated polyethylene sheeting, formed into uniform flexible sheets of thickness shown, or not less than 56 mils if no thickness is shown, complying with the following:
1. Tensile Strength (ASTM D 412): 325 psi min.
 2. Ultimate Elongation (ASTM D 412): 300% min.
 3. Brittleness Temperature (ASTM D 746): -25 deg. F.
 4. Hydrostatic Head Resistance: 200 feet min.
 5. Water Absorption (ASTM D 570): Not more than 0.10% weight gain after 72 hours of immersion at 70 deg. F.

2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Molded-Sheet Drainage Panel: Prefabricated, composite drainage panels, manufactured with a permeable geotextile facing laminated to a molded-plastic-sheet drainage core.
1. Drainage Core: Three-dimensional, non-biodegradable, molded-plastic-sheet material designed to effectively drain water under backfill pressure; complying with the following properties determined according to tests indicated:
 - a. Compressive Strength: 15,000 psi, minimum; ASTM D 1621

- b. Flow Rate: 2.8 gpm per ft., at hydraulic gradient of 0.05 and compressive stress of 25 psi; ASTM D 4716.
2. Geotextile: Woven geotextile fabric, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation less than 50 percent; complying with the following properties determined according to AASHTO M 288:
 - a. Survivability: Class 2.
 - b. Apparent Opening Size: No. 70 sieve, maximum.
 - c. Permittivity: 0.5 per second, minimum.
 - d. Film Backing: Polymeric film bonded to drainage core surface.

2.5 INSULATION

- A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578, shiplap edged.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved:
 - a. Diversifoam Products
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Building Products.
 2. Type IV, 25-psi minimum compressive strength.

2.6 AUXILIARY MATERIALS

- A. Adhesives: Provide types of adhesive compound and tapes recommended by waterproofing sheet manufacturer, for bonding to substrate (if required), for waterproof sealing of seams in membrane, and for waterproof sealing of joints between membrane and flashings, adjoining surfaces and projections through membrane.
- B. Primers: Provide type of concrete primer recommended by manufacturer of sheet waterproofing material for applications required.
- C. Flashing Materials: Except as otherwise indicated, provide types of flexible sheet material for flashing as recommended by waterproofing sheet manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Comply with manufacturer's instructions for surface preparation.
- B. On vertical foundation walls chip off projections where necessary for proper placement and adhesion of waterproofing sheet.

- C. Apply primer to concrete and masonry surfaces at rate recommended by manufacturer of primary waterproofing materials. Prime only area which will be covered by WP membrane in same working day; re-prime areas not covered by WP membrane within 24 hours.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions for handling and installation of sheet waterproofing materials.
- B. Coordinate installation of waterproofing materials and associated work to provide complete system complying with combined recommendations of manufacturers and installers involved in work. Schedule installation to minimize period of exposure of sheet waterproofing materials.
- C. Extend waterproofing sheet and flashings as shown to provide complete membrane over area indicated to be waterproofed. Seal to projections through membrane and seal seams. Bond to vertical surfaces and also, where shown or recommended by manufacturer, bond to horizontal surfaces.
- D. Top Edge Seal: For vertical and sloped wall membrane, finish in reglet (where provided), otherwise finish under flashing or under masonry in joint. Caulk exposed edges with mastic or sealant.
- E. Expansion Joints: Install joint filler as recommended by manufacturer, with protruding rounded surface. Apply continuous 8" wide strip of membrane on joint followed by membrane application.

3.3 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place secured and molded-sheet drainage panels to substrate according to manufacturer's written instructions. Use adhesives that do not penetrate waterproofing. Lap edges and ends to geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. For vertical applications, install board insulation before installing drainage panels.

3.4 INSULATION INSTALLATION

- A. Install one layer of board insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch (19mm) of projections and penetrations.
- B. On vertical surfaces, set insulation units in adhesive or tape applied according to manufacturer's written instructions.

3.5 PERFORMANCE REQUIREMENTS

- A. It is required that waterproof membranes be watertight and not deteriorate in excess of limitations published by manufacturer.

3.6 CLEANING

- A. After completion, remove any masking materials and stains from exposed surfaces caused by waterproofing installation.

3.7 PROTECTION

- A. Institute all required procedures for protection of completed membrane during installation of work over membrane and throughout remainder of construction period. Do not allow traffic of any type on unprotected membrane.

END OF SECTION 071115

SECTION 071920 – WATER REPELLANTS AND ANTI-GRAFFITI COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes penetrating water-repellent and anti-graffiti coatings for the following vertical and horizontal surfaces:

1. Exterior and interior, concrete masonry units. (unpainted and unglazed).
2. Exterior and interior exposed concrete walls and footings not scheduled to receive coatings specified in Division 09 Sections.

- B. Related Sections:

1. Division 03 Section "Cast-In-Place Concrete" for sealer/hardeners.
2. Division 04 Section "Unit Masonry Assemblies."
3. Division 07 Section "Joint Sealants".
4. Division 09 Section "Painting" for paints and coatings.

1.3 PERFORMANCE REQUIREMENTS

- A. Performance Testing: Provide water repellents that comply with test-performance requirements indicated, as evidenced by reports by a qualified independent testing agency on manufacturer's standard products applied to substrates simulating those on Project using same application methods to be used for Project.

1. Material manufacturer representative to perform preconstruction tests on typical wall surfaces to receive water repellent.

- B. Absorption: Minimum 100 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens.

1. Brick: ASTM C 67.
2. Precast Concrete: ASTM C 642.
3. Concrete Unit Masonry: ASTM C 140.

- C. Water-Vapor Transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E 96.

- D. Permeability: Minimum 80 percent water-vapor transmission in comparison of treated and untreated specimens, per ASTM D 1653.

- E. Water Penetration and Leakage through Masonry: Minimum 100 percent reduction in leakage rate in comparison of treated and untreated specimens, per ASTM E 514.

- F. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per ASTM G 154.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include manufacturer's printed statement of VOC content.
 - 2. Include manufacturer's standard colors.
- B. Manufacturer Certificates: Signed by manufacturers certifying that water repellents comply with requirements.
- C. Qualification Data: For Installer.
- D. Preconstruction Testing Reports: For water-repellent-treated substrates.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for assemblies.
- F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

1.6 PROJECT CONDITIONS

- A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:
 - 1. Ambient temperature is above 40 deg F (4.4 deg C).
 - 2. Concrete masonry walls are not treated prior to 30 days after building close-in.
 - 3. Rain or snow is not predicted within 24 hours.
 - 4. Application proceeds more than three days after surfaces have been wet.
 - 5. Substrate is not frozen, or surface temperature is above 40 deg F (4.4 deg C).
 - 6. Windy conditions do not exist that may cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency and anti-graffiti protection specified in Part 1 "Performance Requirements" Article within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion. Warranty to be signed by the Manufacturer and the Applicator.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS/ANTI-GRAFFITI

A. Water Repellents.

1. Manufacturers/Products:

- a. "Water Repellents" by Professional Products of Kansas.
 - 1) Silicone Rubber with 5%, 8%, or 15 % solids with solvent carrier.
 - 2) VOC compliant.
- b. Concrete, "Protectosil" Aqua-Treat 40, Masonry, Protectosil, Chem-Trete PB VOC, by Evonik.
 - 1) 100% active Silane.
 - 2) VOC Compliant.

B. Anti-Graffiti.

1. Manufacturers/Products:

- a. Concrete and Masonry, "Sure Klean Weather Seal Blok-Guard and Graffiti Control" Anti-Graffiti, by ProSoCo.
 - 1) Silicone Rubber 8% or 15% solids with solvent carrier
 - 2) VOC Compliant.
- b. Concrete, "Protectosil" Anti-Graffiti, by Evonik.
 - 1) 100% active Silane.
 - 2) VOC Compliant.
- c. Concrete and Masonry, Anti-Graffiti, by Professional Products of Kansas.
 - 1) Silicone Rubber 8% or 15% solids with solvent carrier
 - 2) VOC Compliant.

2.2 CONCRETE SEALER (SLR in Finish Schedule)

A. Manufacturer/Products:

1. Protectosil "DYNASYLAN BH-N PLUS" by Evonik or approved. 100% active silane treatment with oleophobic additive as represented by Salleeco, Inc. (253) 841-2849.
 - a. Application: In addition to the specified curing compound, apply water repellent to concrete floor slabs scheduled for sealer coat in Finish

Schedule, a minimum of 28 days after the floors have been poured.
Application shall be as recommended by repellent manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to water-repellent manufacturer's written instructions, to ensure that surface is dry enough.
- B. Test for pH level, according to water-repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.
- C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.
- D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.
 - 1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

- A. Apply anti-graffiti up from grade level to a minimum height of ten feet above adjacent floor level or as otherwise indicated on the drawings. Include masonry and concrete seat walls and precast concrete trim/caps.
- B. Start application at bottom of wall and work up surface with flood coat that has a six-to-eight-inch rundown from the spray pattern.
- C. Product shall be applied as supplied by the manufacturer without dilution or alternation, unless noted in the manufacturer's data sheet.
- D. Apply at room temperature and weather conditions recommended by the manufacturer or as written in this specification.
- E. Apply with a low pressure (15 psi) airless spray equipment with a fan spray coarse nozzle, flooding the surface to obtain uniform coverage unless otherwise recommended by the manufacturer.
- F. Apply at a rate of not less than manufacturer's recommended square foot/gallon unless the field tests determine that a heavier rate of application is necessary to meet the performance requirements.

- G. Apply water repellent by brush only at locations where overspray would affect adjacent materials and where not applicable for spray application.
- H. Follow manufacturer's recommendations concerning protection of glass, metal and other non-porous substrates. Contractor will be responsible to clean all surfaces which are contaminated by the water repellent.
- I. Follow manufacturer's recommendation concerning protection of plants, grass and other vegetation. Contractor will be responsible for replacing all plants, grass or vegetation damaged by the water repellent.

3.3 FIELD QUALITY CONTROL

- A. Test Area: Before a sealer application, the following field evaluation will be done. The cost of the field testing will be the responsibility of the Water Repellent Manufacturer.
- B. Prepare a three-foot by three-foot area to be sprayed with the water repellent. The area will be determined by the Owner. Apply the water repellent at a rate to achieve a flood coat application. If recommended by the manufacturer, apply a second coat of the water repellent.
- C. After allowing five days for the sample to cure, run a RILEM uptake test on the treated area.
 - 1. RILEM Test: Place one tube on the treated and one tube on an untreated area. For masonry substrates place a tube on the brick or block, head joint and bed joint. Owner must be present for application of the water repellent and the test.
 - 2. Acceptable minimum results are as stated in the warranty provisions. Coverage rate used to pass this test section must be used on entire project.
- D. Test Area Results: Furnish results of test area absorption on each type of substrate. Test results shall determine application rate.
- E. Application: As specified above.
- F. Post Application Testing: After 5-day drying period, conduct a total of six (6) RILEM Tests at locations as directed by Architect and submit reports of RILEM Tests completed to Architect.
- G. Spray Test: Spray all coated surfaces with water. After surfaces have adequately dried, recoat surfaces that show water absorption.
- H. Manufacturer's Field Services: Provide to Architect a written certification that surface preparation methods and final condition have manufacturer's approval and comply with the warranty.

3.4 CLEANING

- A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

END OF SECTION 071920

Dj/July 17, 2017

SECTION 072100 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Perimeter insulation under slabs-on-grade.
2. Foundation wall insulation.
3. Rigid board polystyrene insulation for vertical application.
4. Plywood-polyisocyanurate composite insulation board for exterior wall applications.
5. Concealed building insulation.
6. Void filling loose fill insulation.
7. Sound attenuation insulation.
8. Vapor retarders.

- B. Related Sections:

1. Division 01 Section "Sustainable Requirements."
2. Division 07 Section "Thermoplastic Membrane Roofing" for insulation specified as part of roofing construction.
3. Division 07 Section "Through-Penetration Firestop Systems" for insulation installed as part of a fire-resistive penetration system.
4. Division 09 Section "Gypsum Board Assemblies" for installation in metal-framed and wood-framed assemblies of insulation specified by referencing this Section.
5. Division 23 Section "Mechanical Insulation" for insulation installed as part of mechanical systems.
6. *Division 04 Section "Unit Masonry Assemblies" for mockup that requires work of this section. (Addendum 2)*

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. **Fiberglass Insulation:** Glass in fibrous form, produced in blanket formed into batts (flat-cut lengths) or rolls.
- B. **Plywood-Poly-isocyanurate Composite Board Insulation:** Rigid insulation panel composed of a closed cell polyisocyanurate foam core bonded to a glass facer on one and fire treated plywood on the other to provide continuous insulation in the building envelope.

- C. Mineral-Wool/Fiber Insulation: Insulation composed of rock-wool fibers or slag-wool fibers; produced in boards and blankets.
- D. Rock Wool Insulation: A non-combustible form of mineral fiber insulation specifically called for in certain fire assemblies.

1.4 SUBMITTALS

- A. Product Data: For each type of insulation product indicated.
- B. Samples for Verification: Full-thickness units for each type of exposed insulation indicated.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.
- D. Research/Evaluation Reports: For foam-plastic insulation.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Cut sheets or letters from product manufacturers indicating that insulation products installed in the building interior comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.

3. Combustion Characteristics: ASTM E 136.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.
- B. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.
- C. Faced Units: Vapor retarder facing to be installed on warm side of exterior walls and ceilings that are a part of the building envelope.

2.2 LEED REQUIREMENTS

- A. Insulation shall include 10% minimum recycled content.
- B. Insulation products installed in the building interior shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.3 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:
 1. Extruded-Polystyrene Board Insulation:
 - a. Amoco Foam Products Company.

- b. DiversiFoam Products.
 - c. Dow Chemical Co.
 - d. UC Industries, Inc.; Owens-Corning Co.
 - e. USG
2. Polyisocyanurate Board Insulation:
- a. Atlas Roofing Corporation.
 - b. Johns Manville International, Inc.
 - c. RMAX.
3. Polyisocyanurate insulation bonded to Fire Treated Plywood: Closed-cell polyisocyanurate (polyiso) foam insulation layer bonded to a nailing surface.
- a. Hunter Panels
 - b. RMax.
 - c. Atlas
4. Glass-Fiber Insulation:
- a. CertainTeed Corporation.
 - b. Knauf Fiber Glass GmbH.
 - c. Owens-Corning Fiberglas Corporation.
 - d. Schuller International, Inc.
5. Mineral Wool/Fiber Insulation:
- a. Thermafiber.
6. Rock Wool Fire Safing Insulation:
- a. Roxul.
 - b. Thermafiber.
 - c. *Johns Manville (Addendum 3)*

2.4 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thickness', widths, and lengths.
- B. Extruded-Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed from polystyrene base resin by an extrusion process using hydrochlorofluorocarbons as blowing agent to comply with ASTM C 578 for type and with other requirements indicated below:
1. Rigid Perimeter Foundation Insulation: Styrofoam SM, USG Foamular, or approved equal minimum; K=.24 minimum thermal resistance: R=10. (bead

- boards are unacceptable). (Provide at all new foundation walls to 2'-0" below grade.)
2. Rigid Board Wall Insulation: Styrofoam SM, USG Foamular, or approved equal minimum; $K=.24$ minimum thermal resistance: $R=10$. (bead boards are unacceptable). (See wall section and detail drawings for applications within exterior walls assemblies.)
- C. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. (See wall section and detail drawings for specific products required, thickness, locations and applications within exterior walls assemblies.)
- D. Polyisocyanurate insulation bonded to Fire Treated Plywood: Closed-cell polyisocyanurate (polyiso) foam insulation layer bonded to a nailing surface.
1. Insulation Layer: Rigid Board Polyisocyanurate.
 2. Nailing Surface 3/4 inch Fire Retardant Treated CDX Plywood (APA rated).
 3. Thermal Performance: R-13 for board with 2 inch foam core.
 4. Compliance:
 - a. ASTM C1289 Type V.
 - b. ASHRAE 90.1.
 - c. International Energy Conservation Code (IECC).
 - d. International Building Code (IBC) Section 2603, Foam Plastic.
 - e. Tested per NFPA 285 to comply with Section 2603.5.5 of IBC.
 - f. Density (Nominal) in accordance with ASTM D1622: 2.0 pcf.
 - g. Compressive Strength in accordance with ASTM D1621: 20 psi.
 - h. Flame Spread, Core in accordance with ASTM E84: 75 or less.
 - i. Smoke Developed, Core in accordance with ASTM E84: 450 or less.
 - j. Water Vapor Transmission in accordance with ASTM E96: Less than 1.5 perms.
 - k. Water Absorption in accordance with ASTM C209: Less than 0.1 percent by volume.
 - l. Dimensional Stability in accordance with ASTM D2126: Less than 2 percent linear change.
 - m. Service temperature: -40 degree F to +250 degree F (-40 degree C to 250 degree C).
 5. Quality Standard Product: RMax, 210 Lyon Drive, Fernley, Nevada 89408. Phone: 800-762-9462. www.rmax.com
 - a. Product: RMax ECOBASEci.
 6. Approved Alternative Product: Hunter Panels, 15 Franklin Street, Portland, Maine 04101. Phone: 888-746-1114. www.hunterpanels.com
 - a. Product: Hunter Panels Xci Ply Class A
 7. Approved Alternative Product: Atlas, 2000 Riveredge Parkway, Suite 800, Atlanta, GA 30328. Phone: 770-952-1442. www.atlaswalci.com

- a. Product: Atlas EnergyShield PlyPro.
- E. Unfaced Fiberglass Insulation: Thermal insulation combining glass fibers with thermosetting resins to comply with ASTM C 665, Type I (blankets without membrane facing).
1. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
 2. Thermal Resistance: Minimum R-25 for exterior walls at 8 inch or larger steel studs, and R-11 for interior acoustical, unless thickness or R-value is indicated otherwise on the drawings.
- F. Rock Wool Fire Safing Insulation: Non-combustible, lightweight, semi-rigid stone wool batt insulation to ASTM C665 Type 1, that provides fire resistance to ASTM E136 and sound control to ASTM E423.
1. Quality Standard Product: Roxul Inc., 420 Bronte Street South, Suite 105, Milton, Ontario, L9T 0H9, Phone: 905-878-8474, Toll Free: 1-800-265-6878, e-mail: contactus@roxul.com,
 - a. Product: Roxul Safe
 2. Alternative Approved Product: Thermafiber, Inc., 3711 Mill Street, Wabash, Indiana, 46992, Phone: Toll Free: 1-888-834-2371, email: info@owenscorning.com,
 - a. Product: Thermafiber Safing
 3. *Other Approved Product: Johns Manville (Addendum 3)*
 - a. *Product: Mineral Wool Safing*
 4. Fire performance:
 - a. Non-combustibility: To ASTM E136.
 - b. Surface Burning Characteristics: To ASTM E84.
 - c. Flame spread: 0.
 - d. Smoke developed: 0.
- G. Mineral Wool/fiber Insulation: Non-combustible, lightweight, semi-rigid stone wool blanket insulation to ASTM C665 Type 1, that provides fire resistance to ASTM E136 and sound control to ASTM E423. Provide faced insulation with spindle-type fasteners at exterior soffit conditions and where indicated on drawings.
1. Quality Standard Product: Thermafiber, Inc., 3711 Mill Street, Wabash, Indiana, 46992, Phone: Toll Free: 1-888-834-2371, email: info@owenscorning.com,
 - a. Faced Product: VersaBoard 35 foil faced.
 - b. Unfaced Product: VersaBoard 35

2. *Other Approved Product: Johns Manville, PO Box 5108 Denver CO 80127, Phone: 1-303-978-2000, email: productsafety@jm.com (Addendum 3)*
 - a. *Faced and Unfaced Product: Mineral Wool Curtainwall Insulation*
 3. Fire performance:
 - a. Non-combustibility: To ASTM E136.
 - b. Surface Burning Characteristics: To ASTM E84.
 - c. Flame spread: 0.
 - d. Smoke developed: 0.
- H. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics. For use where light weight fill of interstitial volume is required.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Central Fiber LLC.
 - b. GreenFiber.
 - c. Hamilton Manufacturing Inc.
 - d. Nu-Wool Co., Inc.

2.5 ACOUSTICAL INSULATION

- A. Fiberglass (Use where sound attenuating batts noted on drawings in thickness to fill stud cavity.)
1. R-8 fiberglass batts shall meet the following requirements:
 - a. Low density unfaced fiberglass.
 - b. 2-1/2" thick.
 2. R-11 fiberglass batts shall meet the following requirements:
 - a. Low density unfaced fiberglass.
 - b. 3-1/2" thick.
 3. R-19 fiberglass batts shall meet the following requirements:
 - a. Low density unfaced fiberglass.
 - b. 5-1/2" thick.
 4. Sill Sealer shall meet the following requirements:
 - a. Low density fiberglass batt.
 - b. 1" uncompressed thickness.
 - c. Width of sill sealer shall be the same width as associated runner.

2.6 VAPOR RETARDERS

A. Performance & Design Criteria:

1. 2 mil thick polyamide (Nylon) sheet.
2. Fire Testing: Tested to ASTM E84.
 - a. Flame Spread Index: 20
 - b. Smoke Developed Index: 55.
3. Permeance: Tested to ASTM E96
 - a. 1 perm or less using dry cup method (Procedure A - Desiccant Method).
 - b. Increases up to 10 perms using wet cup method (Procedure B - Water Method) when moisture increases in building construction, allowing moisture diffusion to interior of building.
4. Quality Standard Product: CertainTeed, "MemBrain" or approved equivalent product by other manufacturer.

B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.7 AUXILIARY INSULATING MATERIALS

- ### A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- a. Quality Standard Product: Gemco Tuff Bond Hanger Adhesive

2.8 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
2. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
2. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.

- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
 - 1. Quality Standard Products:
 - a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Eckel Industries of Canada; Stic-Klip Type S Adhesive.
 - c. Gemco; Tuff Bond Hanger Adhesive.
- E. Install rigid board insulation on concrete substrate as follows:
 - 1. Fasten insulation to concrete substrates using an insulation manufacturer's recommended adhesive product in accordance with adhesive manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation completely separates piping from building exterior.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- C. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.
- D. Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

- D. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
- E. Install Rock Wool (Fire Rated) insulation in a manner similar to mineral fiber insulation in compliance with the rated design number instructions per the rating agency employed in certifying the fire rated assembly.

3.6 INSTALLATION OF PLYWOOD-POLYISOCYANURATE COMPOSITE INSULATION

- A. Install in exterior spaces without gaps or voids. Do not compress insulation.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.
- D. Exposed insulation must be protected from open flame and kept dry at all times.
- E. Fasten composite insulation to the structural base wall. Coordinate with the cladding or wall finish manufacturer for the attachment requirements over insulation panels. Contact manufacturer for guidance when determining fastening pattern.
- F. Exterior wall insulation is not intended to be left exposed for extended periods of time in excess of 45-60 days without adequate protection. If extended exposure is anticipated all exposed foam surfaces including corners, window and door openings, should be taped with a compatible waterproof tape.

3.7 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints.
- C. Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- F. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.8 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Water Resistant Barrier/ Air Barrier (WRB/AB)
2. Self-Adhered Flashing (SAF)
3. Elasticized Self-Adhered Flashing (ESAF)
4. Self-Adhered Membrane (SAM)
5. Foil Face Self-Adhered Membrane (FFSAM)
6. Sill-Sealer Gaskets

- B. Related Sections:

1. Division 01 Section "Sustainable Requirements."
2. Division 01 Section "Envelope Testing" for testing of Weather Barrier components.
3. Division 01 Section "Air Barrier System Quality Control" for administration and coordination of Weather Barrier components and related work.
4. Division 06 Section "Sheathing" for sheathing joint and penetration treatment.
5. Division 07 Section "Building Insulation" for thermal insulation continuous with work of this Section.
6. Division 09 Section "Gypsum Board Assemblies" for insulation installed in conjunction with interior wall finish systems.
7. *Division 04 Section "Unit Masonry Assemblies" for mockup that requires work of this section. (Addendum 2)*

1.3 SUBMITTALS

- A. Product Data: For each type of product.

1. For weather barrier, include data on air penetration resistance and water-vapor permeance based on testing according to referenced standards.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.

- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 WARRANTY

- A. Provide manufacturer's standard material warranty in which manufacturer agrees to provide replacement material for the fully self-adhered water-resistive vapor permeable air barrier sheets installed in accordance with manufacturer's instructions that fail due to material defects within 20 years of the date of Purchase.

PART 2 - PRODUCTS

2.1 Weather Barrier

- A. Weather Barrier Assembly: Collection of weather barrier components assembled together to provide a continuous plane of water and air tightness over the entire building envelope. The system is comprised of, but not limited to, the water resistive barrier/ air barrier, tapes, air barrier sealants, self-adhered flashing, self-adhered membrane, gaskets, joint sealants (specified in Division 7) and roofing (specified in Division 7).
 - 1. Water Resistive Barrier/Air Barrier (WRB/AB): Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; without perforations; and complying with ASTM E 1677, Type I.
 - a. Mechanically attached w/ manufacturer approved fasteners.
 - b. Thickness: Not less than 3 mils.
 - c. Permeance: Not less than 20 perm per ASTM E96-00
 - d. Flame-Spread Index: 25 or less per ASTM E 84.
 - e. Allowable Exposure Time: Not less than three months.
 - f. Basis of Design product: Tyvek Commercial Wrap
 - g. *Other approved product: VaproShield WrapShield SA (Addendum 3)*
 - 2. WRB/AB Tape: Pressure-sensitive plastic tape recommended by WRB/AB manufacturer for sealing joints and penetrations.
 - 3. WRB/AB Sealant: Butyl based non-hardening sealant recommended by WRB/AB manufacturer for sealing to all surrounding construction. Apply in concealed locations wherever barrier/wrap is seamed or interrupted by other impermeable construction. Use only outside of vapor retarder.
 - 4. Self-Adhered Flashing (SAF): Self-Adhered flashing width to be 9" or as indicated on drawings to have polyethylene laminate face, butyl adhesive, 30 mil thickness. Acceptable products include Dupont Straight Flash and Henry Blue Skin.
 - 5. Elasticized Self-Adhered Flashing (ESAF): At exterior wall penetrations and as indicated on drawings provide self-adhering flexible flashing tape with elasticized polyethylene laminate, 60 mil thickness, with elastic elongation to exceed 200% or relaxed length. Acceptable products include Dupont Flexwrap-NF.

6. Self-Adhered Membrane (SAM): Self-Adhering sheet product, SBS based, 40 mil thick for use in base transitions to concrete, below grade waterproofing and damproofing. Provide Henry Blueskin SALT, Protecto P.W. 100/40, Grace Permabarrier or approved comparable product.
7. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch ; selected from manufacturer's standard widths to suit width of sill members indicated or closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
8. WRB/AB Fastener Caps: Dupont Tyvek Wrap Caps installed per manufacturer's recommendations.
9. Primer: Provide primers as recommended by manufacturers of self-adhered flashing types.

PART 3 - EXECUTION

3.1 WATER RESISTIVE BARRIER/ AIR BARRIER INSTALLATION

A. Cover sheathing with weather barrier as follows:

1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
3. Seal seams, edges, fasteners, and penetrations with tape.
4. Extend into jambs of openings and seal corners with tape.
5. Comply with manufacturer's written instructions.
6. Provide WRB/AB and its accessories in such a fashion that it provides a continuous air barrier.

3.2 WATER RESISTIVE BARRIER/ AIR BARRIER TAPE APPLICATION

1. Transition, overlap, seal or integrate WRB/AB and its accessories into other weather barrier assembly components in an air tight fashion.

3.3 SELF-ADHERED FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturers written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over WRB/AB at all sides of openings.
4. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.
5. Do not allow asphalt bearing flexible flashing to come into contact with PVC roofing. In instances where these two materials are in close proximity, substitute

a non-asphalt bearing self-adhering flexible flashing or add a separation layer as required by manufacturer between self-adhered flashing and PVC roofing.

6. See Drawings for details.

3.4 PROTECTION

- A. Protect wall areas covered with primary weather barrier from damage due to construction activities, high wind conditions, and extended exposure to inclement weather.
- B. Review condition of weather barrier assembly prior to installation of cladding. Repair, or remove and replace damaged sections with new membrane.
- C. Recommend to cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed primary weather barrier installations.
- D. Remove and replace weather barrier assembly affected by chemical spills or surfactants.

END OF SECTION 072500

SECTION 072616 – BELOW-GRADE VAPOR RETARDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Underslab vapor retardant sheeting.
 - 2. Taped seams and openings.
- B. Related Sections:
 - 1. Division 03 Section “Cast-in-Place Concrete.”
 - 2. Division 20-23 Mechanical Sections.
 - 3. Division 26-28 Electrical Sections.
 - 4. Division 31 Section “Earthwork.”

1.3 SYSTEM DESCRIPTION

- A. Vapor retardant sheeting installed over prepared subgrade, capillary break (Specified in Division 31) with concrete slab placed directly over vapor retarder.
- B. Taped and sealed penetrations, holes, tears, and vapor retarder laps.

1.4 REFERENCES

- A. Reference Standards: Current edition at date of Bid.
- B. American Concrete Institute (ACI):
 - 1. ACI 302.IR: Guide for Concrete Floor and Slab Construction.
 - 2. ACI 302.2R: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
- C. American Society for Testing and Materials (ASTM).
 - 1. ASTM D 882: Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - 2. ASTM D 1004: Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
 - 3. ASTM D 1709: Standard Test Method for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
 - 4. ASTM D1790: Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact.

5. ASTM E 154: Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover.
6. ASTM E 1643: Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
7. ASTM E 1745: Standard Specifications for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.5 PERFORMANCE REQUIREMENTS

- A. Performance Standard: ASTM E 1745, Class A, sheet vapor retarder.
 1. Moisture Vapor Permeance: 0.03 perms, 0.30 perms required tested to ASTM E 154.
 2. Puncture Resistance: Minimum 2200 grams, tested to ASTM D 1709 Method B.
 3. Tensile Strength: 45 foot-pounds per inch, tested to ASTM E 154, Section 9, Method ASTM D 882.
- B. Initial Tear Resistance: Minimum 8.0 pounds force in machine direction and transverse direction, tested to ASTM D 1004.
- C. Low Temperature Impact Pass minus 120 degrees C, tested to ASTM D1790.

1.6 SUBMITTALS

- A. Submit under provisions of Division 01 Section "Submittal Procedures."
- B. Product Data: Published descriptive literature for vapor retarder and patching materials.
- C. Sample: Approximately 8-1/2 by 11 inch, showing compliance with specified requirements. Include accessory products associated with installation.
- D. Certified Test Data: Include manufacturer's test data results, certified in writing from independent testing agency.
- E. Manufacturer Instructions: Installation instructions, special procedures, and perimeter, penetration and other conditions requiring special attention. Include limitations.

1.7 QUALITY ASSURANCE

- A. Geotechnical Report: Report made available to bidders is not a Contract Document. Do not follow Geotechnical Report recommendations that differ from Contract Document provisions.
- B. Do not install sand layer or other granular fill over vapor retarder prior to placement of concrete slab-on-grade.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Take precautions to prevent puncturing and tearing vapor retarder.

- B. Store in location conforming to manufacturer's instructions.

1.9 COORDINATION

- A. Comply with Division 01 Section "Project Coordination" for coordination with work of other Sections.
- B. Division 03 Section "Cast-in-Place Concrete" for cast-in-place concrete slab placement directly over vapor retarder.
- C. Divisions 22, 23 and 26 for penetrations through vapor retarder by piping, conduits and ductwork.
- D. Division 31 for sub-grade under vapor retarder, fully compacted and complete.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Insulation Solutions, Viper ViperCheck II, Underslab Vapor Retarder, 15-mil Class A.
 - 1. Cell (253) 670-1510, Tel (253) 946-2436, Fax (253) 941-2635, arobertwsimmons@cs.com (R.W. Simmons & Associates, Inc., Bob Simmons, CSI)
 - 2. Email kendall@insulationsolutions.com (Kendall Crooke, CSI, National Sales Mgr)
 - 3. Web Site <http://www.insulationsolutions.com>
- B. STEGO Industries LLC., STEGO Wrap 15-mil Class A.
 - 1. Cell (949) 212-8000, Tel (206) 212-6918, Fax (206) 212-6515, Email trevor@stegoindustries.com (Trevor Yost - NW Regional Manager).
 - 2. Tel (877) 464-7834, Fax (949) 257-4113, Email mathewblasdel@stegoindustries.com (Matt Blasdel, Technical Director)
 - 3. Web Site <http://www.stegoindustries.com>
- C. Raven Industries, Vapor Block 15, ASTM E1745 Class A, 15-mil polyolefin vapor retarder. <no local product representation>
 - 1. Tel 1-800-635-3456, Email construction@ravenefd.com / Email allen.schenker@ravenind.com (Allen Schlenker, National Market Specialist)
 - 2. Web Site <http://www.vaporblock.com>
- D. WR Meadows, Sealtight Perminator 15.
 - 1. Cell (503) 333-6023, Email ballen@wrmeadows.com (Byron Allen, Mfrs Rep)
 - 2. Tel (707) 745-6666, Email wrmnca@wrmeadows.com
 - 3. Web Site <http://www.wrmeadows.com>
- E. Integrally Bonded Vapor Barrier: ASTM E 1745, Class A polyolefin sheet.

1. Product: Grace Waterproofing Products, Florprufe 120

- F. Substitution Requests: Submit for approval under provisions of Division 01 Section "Product Substitutions and Options."

2.2 PERFORMANCE / DESIGN CRITERIA

- A. Vapor Barrier: Exceed provisions ASTM E1745 Class A, 15-mil polyolefin vapor retarder, as specified by this Section.

1. Properties: Conform to test methods specified by ASTM E1745, Section 7 for results as specified by this Section.

- a. Moisture Vapor Permeance: Maximum 0.01 perms for conditioned vapor retarder sheet tested to ASTM E154 Sections 8, 11, 12, and 13 or ASTM F1249.
- b. Tensile Strength: Minimum 45 foot-pounds per inch, tested to ASTM E154, Section 9, using apparatus described in either Test Method ASTM D828 or ASTM D882.
- c. Puncture Resistance: Minimum 2445 grams, tested to ASTM D1709 Test Method B.

2.3 ACCESSORIES

- A. Pressure Sensitive Tape: As instructed by manufacturer.
- B. Seam Splice Tape Primer: As instructed by manufacturer.
- C. Other Accessories: As instructed by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected.
- B. Verify subgrade free from conditions that may cause puncture or other damage to vapor retarder.

3.2 PREPARATION

- A. Complete substrate work before beginning work of this Section.
 1. Granular Base Course: As specified Division 31. Level, tamp or roll as necessary for smooth level surface prior to installation of vapor retarder.
 2. Through-Slab Penetrations: Sealed ready for work of this Section.
 3. Underslab Utilities: Drain lines and utilities of Divisions 22, 23 and 26.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, ASTM E 1643, and provisions of Contract Documents.
- B. Interior Concrete Slabs-On Grade: Provide vapor retarder as specified this Section whether or not shown on Drawings.
- C. Install vapor retarder sheet in widest practical width, parallel with direction of concrete pour, with minimum number of joints over compacted base, as specified Division 31.
- D. Lap vapor retarder over footings, and turn up to full slab thickness, except as inhibited by reinforcing, water stops, and other impediments. Seal with pressure sensitive tape to make continuous monolithic membrane moisture barrier at footings, columns, and other penetrations and terminations.
- E. Overlap joints 6 inches min. at side and end laps and seal with pressure sensitive tape.
- F. Promptly patch tears and punctures as they occur.
- G. Repair damaged areas by cutting vapor retarder patches. Overlap tears and holes 6 inch beyond damaged area with patches. Seal patch to installed vapor retarder with pressure sensitive tape or as instructed by manufacturer.
- H. Seal pipe penetrations and other openings through concrete slab with vapor retarder or factory fabricated boots and pressure sensitive tape. Field fabricate boots and other shapes as necessary to seal vapor retarder against vapor penetration.
- I. Place concrete slab-on-grade directly over installed vapor retarder under work of Section 033000. Do not install granular fill layer over vapor retarder.

3.4 FIELD QUALITY CONTROL

- A. Inspect completed installation prior to placing concrete slab-on-grade in accordance with Division 01 Section "Quality Requirements."
- B. Verify vapor retarder installed in accordance with manufacturer's instructions with permanent penetrations taped and sealed.
- C. Verify that vapor retarder has not been penetrated by screed stakes and that base set screed posts are in place.

3.5 ADJUSTMENTS

- A. Patch penetrations with pressure sensitive tape and make adjustments as necessary to maintain performance of vapor retarder as instructed by manufacturer.
- B. Do not patch or seam when vapor retarder is wet.

3.6 PROTECTION

- A. Protect From Penetration: Do not permit use of ground set stakes, screed posts, and other items to puncture vapor retarder. Where punctured, remove penetrating item and patch vapor retarder, as specified this Section, before placing concrete.
- B. Lay plywood or other protection board over installed vapor retarder at areas of heavy traffic and other construction loads. Do not stack construction materials directly on vapor retarder.

END OF SECTION 072616

SECTION 074213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Exposed-fastener, lap-seam solid and perforated corrugated zinc wall panels.

- B. Related Sections:

- 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 05 Section "Metal Fabrications" for steel plate wall panels and base.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, installation instructions, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

- B. Shop Drawings:

- 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

- C. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:

- 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

- D. Qualification Data: For Installer.

- E. Sample Warranties: For special warranties.

- F. Maintenance Data: For metal panels to include in maintenance manuals. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: (1) year from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F ambient.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. General: Provide factory-formed perforated metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

- B. Corrugated-Profile, Exposed-Fastener Metal Wall Panels formed with alternating sine-curved ribs across width of panel.
 - 1. Solid zinc alloy sheet complying with ASTM B69-13
 - a. Nominal Thickness: 0.040 inch (1.02 mm).
 - 2. Rib Spacing: 2.67 inches o.c.
 - 3. Panel Coverage: 35.5 inches (901.7 mm.)
 - 4. Panel Height: 7/8 inch (22.225 mm)
 - 5. Quality Standard Manufacturer: Jarden Zinc, P.O. Box 1890, Greenville, TN 37744-1890. Phone: 423-639-3125. www.jardenzinc.com
 - a. Alternate Acceptable Manufacturer: VMZinc by Umicor Building Products, 3600 Glenwood Avenue, Suite 250, Raleigh, NC 27612. Phone 919-874-7173. www.vmzinc-uw.com
 - 6. Quality Standard Product: Jarden Zinc Corrugated Sine Wave Panel.
 - a. Alternate Acceptable Product: VMZinc corrugated sine wave panel.
- C. Corrugated-Profile, Exposed-Fastener Perforated Metal Wall Panels.
 - 1. Same as Metal Wall Panels with the following perforation pattern, to be located at the second floor exterior deck and all guardrails:
 - a. Pattern: Round
 - b. Hole Size: 0.188 inch
 - c. Staggered Centers: 0.313 inch
 - d. Transparency: 33% open
 - 2. Same as Metal Wall Panels with the following perforation pattern, to be located at the roof level mechanical screen:
 - a. Pattern: Round
 - b. Hole Size: 0.188 inch
 - c. Staggered Centers: 0.375 inch
 - d. Transparency: 23% open

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, **G90**. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural

Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Zinc panel Color and Finish: Jarden Zinc Presidential Onyx Black.
 1. Alternative acceptable color and finish: VMZinc Anthra-Zinc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

- a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal panels.
 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal panel work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners: Manufacturer's recommended fasteners for surfaces exposed to the exterior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.

3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 5. Flash and seal panels with weather closures at perimeter of all openings.
- E. Watertight Installation:
1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal wall panel installation, including accessories.

- B. Remove and replace metal wall panels where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare inspection reports.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.13

SECTION 075410 - THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. ~~Mechanically attached~~ "Fully adhered" (Addendum 2) single ply thermoplastic membrane roofing system with hot air welded seams.
 2. Rigid insulation, tapered rigid insulation, vapor barrier and roof board.
 3. Membrane flashings, membrane clad metal flashing (material only), pedestrian traffic membrane, fastenings, and adhesives.
 4. Separation board.
 5. Cover board.
 6. Roof insulation.
 7. Underlayment and vapor retarders/temporary roofing.
- B. This Section includes the installation of acoustical roof deck rib insulation strips furnished under Division 05 Section "Steel Decking."
- C. Related Sections include the following:
1. Division 01 Section "Sustainable Requirements."
 2. Division 05 Section "Steel Deck" for furnishing acoustical deck rib insulation.
 3. Division 06 Section "Rough Carpentry" for blocking.
 4. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
 5. Division 07 Section "Roof Accessories"
 6. Division 07 Section "Joint Sealants."
 7. Division 15 Section "Soil, Waste, Vent and Storm Drain Piping Systems" for roof drains.
- D. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 REFERENCES

- A. Reference Standards: Current edition at date of Bid, except where indicated.
- B. ASTM International (ASTM):
1. ASTM C 518: Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

2. ASTM D 1621: Test Method for Compressive Properties of Rigid Cellular Plastics.
 3. ASTM D 1622: Test Method for Apparent Density of Rigid Cellular Plastics.
 4. ASTM D 2126: Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 5. ASTM D 4434: Specification for Poly (Vinyl Chloride) Sheet Roofing.
 6. ASTM D 6754: Standard Specification for Ketone Ethylene Ester Based Sheet Roofing.
 7. ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials.
- C. Underwriters Laboratories, Inc. (UL): UL 790 -Tests for Fire Resistance of Roof Covering Materials.
- D. Factory Mutual (FM): Factory Mutual Approval Guide, Loss Prevention Data Sheets.
- E. ANSI/SPRI ES-1.

1.4 DEFINITIONS

- A. PVC: Poly vinyl chloride.
- B. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- C. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
- D. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
- D. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing

system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1. Fire/Windstorm Classification: Class 1A-90.

1.6 SUBMITTALS

- A. Submit under provisions of Division 01 Section "Submittal Procedures."
- B. Shop Drawings: Dimensioned drawings showing roof outlines, profile details of flashing methods for penetrations and terminations, and technical acceptance from manufacturer.
- C. Product Data: Manufacturer's current product literature, installations instructions, and specifications.
- D. Samples: Minimum 8 inch by 10 inch sample of membrane, membrane coated metal flashing, fasteners, and system components showing compliance with specifications.
- E. Color Samples: Manufacturer's standard membrane colors.
- F. Qualified Installer Certification: Manufacturer's written statement, signed by manufacturer's authorized representative, certifying roofing installer as trained and certified by manufacturer to perform work for this Project.
- G. Product Certification: Manufacturer's written statement, signed by manufacturer's executive officer, certifying compliance with provisions of Contract Documents including referenced ASTM, UL, and FM Standards.
- H. Manufacturer's Instructions: Include manufacturer's guide specifications, installation requirements, special procedures, and conditions requiring special attention.
- I. Sample Warranty: Meet or exceed provisions specified by this Section.
- J. Tapered Insulation Layout Plan – provide tapered layout plan for those areas requiring tapered insulation. Layout plan shall include, but not be limited to, crickets, sumps, transitions and indicate slope (units vertical/ units horizontal) of drainage valleys.

1.7 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Cut sheets for each roofing material that includes information regarding the initial Solar Reflectance Index (SRI), tested in accordance with ASTM 1980 requirements. If SRI

information is not available, information must be provided for both the emissivity and solar reflectance values.

1.8 QUALITY ASSURANCE

A. Single Source Responsibility:

1. Provide system and components under responsibility of single roofing manufacturer.
2. Perform roofing and related flashing and sheet metal work by or under supervision of single installer.

B. Roofing Foreman: On site for full duration of the roofing portions of the Project.

C. Polyisocyanurate Insulation Board: Supply in thickness to produce R-Value as indicated.

1.9 QUALIFICATIONS

A. Installer:

1. Trained and certified by manufacturer as authorized installer for work of this Project.
2. 5 years documented experience installing single ply roofing of comparable scope and type.
3. Roofing Foreman: Minimum 2 projects installing manufacturer's system.

1.10 PRE-INSTALLATION CONFERENCE

A. Arrange, in accordance with Division 01 Section "Project Meetings."

B. Attendance: Contractor, installer, Owner, Architect, Owner's Roofing Consultant, manufacturer, and as requested to attend.

C. Arrange conference and job walk-through, minimum 2 weeks prior to completion of roofing substrate and beginning roofing work of this Section.

1.11 REGULATORY REQUIREMENTS

A. Underwriters Laboratories (UL): UL 790, Class A Fire Hazard Classification.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

1. Store rolls lying down on pallets, cover, and protect from moisture.

- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
 - 2. Store bonding adhesives at temperatures above 40 degrees F.
- C. Store flammable materials in cool dry place away from sparks and flame.
- D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- E. Do not overload roof. Load goods so as not to cause structural damage or failure, or create a safety hazard.

1.13 PROJECT SITE CONDITIONS

- A. Weather Conditions: Conform to manufacturer's instructions during extremes of temperature and humidity. Where moisture is present, do not install over wet or moist substrates.
- B. Install only as much of the roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat-welded before leaving the job site that day.
- C. All surfaces to receive new materials shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application. Do not apply roofing to damp or wet substrate.
- D. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- E. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

1.14 COORDINATION

- A. Coordinate with related work of other Sections in accordance with Division 01 Section "Project Coordination."
- B. Arrange work sequence to prevent foot traffic, rolling loads, movement of equipment, and storage of materials, on unprotected roofing membrane.

- C. Coordinate with Division 22 Section “Soil, Waste, Vent and Storm Drain Piping Systems.”

1.15 WARRANTY

- A. Conform to Warranty provisions specified Division 01 Section “Warranty Procedures.”
- B. Manufacturer: Standard 20 year non-prorated, labor and materials watertightness System Warranty, including, vapor barrier, roof board, rigid insulation, fasteners, and membrane roofing and flashings as complete roofing system. Warranty exclusions for conditions leading to standing water and insufficient roof slope not accepted.
 - 1. Manufacturer to provide 2 hours of training to Owner’s staff in the maintenance and repair of membrane roofing. Warranty to include roof integrity of up to 70 MPH.
- C. Contractor: 2 year workmanship warranty guaranteeing watertightness for system including at flashing, terminations, and penetrations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design:
 - 1. Sarnafil, Inc.
 - a. Tel 1-800-727-6234 / (253) 274-1500, Fax (253) 274-1501, Cellular (206) 351-9126, Email w@wmclarkandassociates.com (Northwest Regional Office, William Clark CSI, CDT).
 - b. Web Site <http://www.sarnafilus.com>.
- B. Acceptable Alternative Manufacturers:
 - 1. Carlisle SynTec
 - a. Tel 1-800-479-6832 / (253) 271-3221, Email Karen.smith@syntec.carlisle.com (Northwest Regional Office, Karen Smith).
 - b. Web Site <http://carlisesyntec.com>
 - 2. Duro-Last DTF 60 mil
 - a. Tel 1-866-735-8824 / (253) 225-4858, Email wmmwilliams@msn.com (Northwest Regional Office, Will Williams).
 - b. Web Site <http://duro-last.com>
 - 3. FiberTite 60 mil Fleecebacked Membrane

- a. Tel 1-800-927-8578 / (503) 516-6336, Email ian@exteriorallied.com
(Northwest Regional Office, Ian Murphay).
 - b. Web Site <http://www.fibertite.com>
4. Soprema
- a. Tel 1-800-356-0066 / (425) 305-9069, Email kbryant@soprema.us
(Northwest Regional Office, Kelly Bryant).
 - b. Web Site <http://www.soprema.us>
- C. Substitution Requests: Submit for approval prior to Bid under provisions of Division 01 Section "Product Substitutions and Options."

2.2 LEED REQUIREMENTS

- A. For roof surfaces with a slope of less than or equal to 2:12, roofing material must have a minimum Solar Reflectance Index (SRI) of 78.
- B. For roof surfaces with a slope of greater than 2:12, roofing material must have a minimum Solar Reflectance Index (SRI) of 29.

2.3 ROOFING MATERIALS

- A. PVC Membrane: Fiberglass or polyester fabric reinforced polyvinyl chloride (PVC) thermoplastic membrane.
 1. Classification: ASTM D 4434 Type II Grade 1 or Type III.
 2. Thickness: Minimum 60 mils thick.
 3. Color: White
 4. ~~Mechanically Attached~~ Fully Adhered (Addendum 2) Sarnafil S327.
- B. Prefabricated Membrane Flashing: Manufacturer's standard manufactured configurations for flashing pipe penetrations, inside and outside corners, and other conditions. Match color and thickness of roofing membrane.
 1. Sarnafil S327.
- C. Traffic Membrane (Traffic Mats): Manufacturer's, 2 foot by 2 foot square, non-skid PVC thermoplastic membrane.

2.4 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

- C. Sealants: Membrane manufacturer's approved sealant shall be used to seal penetrating through the membrane system and at miscellaneous sealant applications that come in contact with roof system components.
- D. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.
- E. Sealing Tape Strip: Compressible foam with pressure sensitive tape on one side. Sealing tape strip is to be used with metal flashing as preventive measure against air and wind-blown moisture entry.
- F. Metal Reglet: Manufacturer's 6063T5 extruded aluminum counterflashing, approximately 2.25-inches wide and 0.10-inches thick, prepunched at 8-inches o.c. for attachment to the wall or curb. Use prefabricated mitered inside and outside corners where walls intersect.
- G. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. PVC Clad Metal: Manufacturer's 24 gauge G90 galvanized metal with 20 mil ± unsupported PVC membrane laminated on one side. Color shall match roofing membrane. Provide this material to Division 07 Section "Sheet Metal Flashings and Trim" subcontractor to be fabricated into metal flashings and installed as work of Division 07 Section "Sheet Metal Flashings and Trim".
- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.
- K. Wormgear Clamps: 100% 316 Stainless steel wormgear clamp.

2.5 VAPOR BARRIER / TEMPORARY ROOFING

- A. Vapor Barrier/ Temporary Roofing Self-adhering Membrane: Provide Sarnavap – Self Adhered by Sika/Sarnafil. Provide as the vapor retarder where a vapor retarder is identified as part of the roof type.

2.6 GYPSUM COVER BOARD

- A. Manufacturers:
 - 1. Georgia Pacific, Dens-Deck, glass mat faced, silicone-treated gypsum core panel.
 - 2. Owens Corning, Strataguard, silicon impregnated, solid reinforced gypsum core panel. Dens-Deck Primed at Cover Board applications.
- B. Size and thickness:

1. Cover Board: 1/2-inch, 4 feet by 8 feet.
- C. Fire Resistance: As required to meet requirements for barrier board at roofing assembly.
 1. Surface Burning Characteristics: Tested to ASTM E 84
 - a. Flamespread: 0.
 - b. Smoke Developed: 0.
 2. Non-Combustible: Tested to ASTM E 136.

2.7 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Thermal insulating value shall be a minimum of R-41 overall. Product shall be polyisocyanurate board.
- C. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
 1. Manufacturers:
 - a. Atlas Roofing Corporation.
 - b. Johns Manville International, Inc.
 - c. RMAX.
- D. Tapered Insulation: Provide factory-tapered polyiso insulation boards fabricated to achieve a final slope of 1/4 inch per 12 inches, unless otherwise indicated. Provide wherever crickets material does not achieve specified minimum slopes.
- E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- F. Cricketing Material:
 1. Tapered Insulation: Provide in 1/8", 1/4", 1/3" standard or custom taper per foot slopes as indicated roof slopes require.
 2. Tested: UL Class A for ballasted roof systems and fully adhered roof systems over combustible and non-combustible decks.
 3. Secure cricketing to substrate using manufacturer recommended adhesive. Prepare upper surface of cricketing for adhesive attachment of polyiso roof insulation specified herein.

2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.9 ACCESSORIES

- A. Solvent Cleaner: As instructed by manufacturer for removal of adhesive and contaminants from membrane.
- B. Hot Air Welder: As instructed by manufacturer for membrane joint seaming.
- C. Provide roofing membrane and roofing insulation adhesives compatible with and recommended for the substrate and component being adhered by the roofing membrane or insulation manufacturer.
- D. Mastic: As instructed by manufacturer.
- E. Roof / Equipment Curbs: Coordinate with Section 077200.
- F. Roof Equipment: Coordinate with Division 15.
- G. Other Accessories: In accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions as satisfactory to receive work of this Section.

3.2 PREPARATION

- A. Work of Other Sections: Verify that metal flashings, crickets, roof penetrations, and other preliminary related work are in place.
- B. Roof Decks: Sweep and vacuum surfaces clean prior to roofing application.
 - 1. Surface: Free of protruding fasteners, depressions, fins, raised edges.
 - 2. Condition: Structurally sound, dry, free of contamination.
 - 3. Weather: Moisture, temperature conditions in accordance with roofing manufacturer's instructions.
- C. Make provisions for roof penetrations, including vents, roof accessories, and equipment specified Divisions 15.
- D. Cricket: Provide for positive drainage and for watertight installation as instructed by manufacturer.

3.3 INSTALLATION

- A. Install roofing components in accordance with manufacturer's instructions and provisions of Contract Documents.

3.4 COVER & SEPARATION BOARD INSTALLATION

- A. Install as required to meet required UL Fire Hazard Classification for roofing assembly.
- B. Adhesively attach over uninsulated steel deck where required to act as thermal barrier board and membrane substrate conforming to UL for Fire Resistance Classification indicated. Apply in multiple layers with joints in successive layers offset.
- C. Provide roof curbs, nailers and blocking at appropriate heights and locations prior to installation of insulation.
- D. Separation board shall be between metal decking and rigid insulation.
- E. Cover board shall be between the rigid insulation and roofing membrane. Provide cover board at walls abutting roof, where detailed and noted as glass-mat gypsum.

3.5 VAPOR BARRIER / TEMPORARY ROOF INSTALLATION

- A. Apply self-adhering sheet material with 6"laps directly over metal roof decking or separation board that has been primed with manufacturer's water based primer. Flash-in at all obstructions and penetrations through temporary roof. Provide 6" wide galvanized metal plate to support the membrane end lap between metal deck flutes ensuring a complete end lap seal.

3.6 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered crickets where required for drainage as first layer of insulation.
- D. Install tapered insulation under area of roofing to conform to slopes indicated where crickets does not achieve required slope.
- E. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

- G. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
- H. Cut and fit insulation within 1/4 inch of projections, and penetrations.
- I. Adhesively Fastened Insulation: Install each layer of insulation and secure to deck using adhesive specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- J. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck. Install with adhesive according to type of installation indicated on drawings.
 - 1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.7 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. ~~Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.~~
 - 1. ~~Install sheet according to ASTM D 5082.~~
- B. ~~Mechanically fasten sheet securely at terminations and perimeter of roofing. In Seam Attachment: Secure one edge of the sheet using fastening plates or battens centered within the membrane seam and mechanically fasten sheet to roof deck. Field weld seam according to "Seam Installation" Article.~~
- C. ~~Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.~~
- D. ~~Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.~~
- E. ~~Spread sealant bed over deck drain flange at deck drains and securely seal roofing sheet in place with clamping ring.~~
- F. ~~Apply roofing membrane with side laps shingled with slope of roof deck where possible.~~
- G. ~~Seams: Clean seam areas, overlap roofing membrane, and hot air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.~~

1. ~~Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.~~
 2. ~~Verify field strength of seams a minimum of twice daily and repair seam sample areas.~~
 3. ~~Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.~~
- H. ~~Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.~~

3.7 *ADHESIVELY FASTENED ROOFING MEMBRANE INSTALLATION (Addendum 2)*

- A. *Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.*
1. *Install sheet according to ASTM D 5082.*
- B. *Apply adhesive per roof membrane manufacturer's instructions and secure membrane in manner and under the conditions recommended by the roof membrane manufacturer.*
- C. *Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.*
- D. *Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.*
- E. *Adhesively secure roofing membrane securely at terminations, penetrations, and perimeter of roofing.*
- F. *Apply roofing membrane with side laps shingled with slope of roof deck where possible.*
- G. *Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.*
1. *Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.*
 2. *Verify field strength of seams a minimum of twice daily and repair seam sample areas.*
 3. *Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.*
- H. *Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.*

3.8 MEMBRANE FLASHING INSTALLATION

- A. Membrane Flashing: Adhere with contact adhesive and hot air welded seams. Tie into manufacturer's termination bars and clad metal flashing systems as necessary to make watertight system.
1. All flashings shall be installed concurrently with the roof membrane as the job progresses.

2. No temporary flashings shall be allowed without the prior written approval of the Architect and Manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.
 3. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
 4. Apply bonding adhesive per manufacturer's instructions. Adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. Do not apply to seam area of flashing.
 5. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane.
 6. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
 7. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars. Coordinate flashing with counterflashing installation.
 8. Terminate and seal top of sheet flashings at penetrations passing through the membrane; anchor at top with a wormgear clamp. Coordinate flashing with umbrella installation.
 9. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level.
 10. Protection Layer: Install protection layer over completed membrane in accordance with membrane manufacturer's recommendations in all areas where wood sleepers or pipe supports are to be installed on the roof membrane.
- B. Parapets: Adhere up parapet wall and over top of parapet. Cover with sheet metal coping under work of Division 07 Section "Sheet Metal Flashing and Trim".
- C. Vent Stacks and Pipe Penetrations: Flash with manufacturer's standard one-piece manufactured thermoplastic membrane flashing.
- D. Seal to air barrier assembly where required. Add separation layer between incompatible materials.
- E. Traffic Membrane: Hot air weld to membrane roofing with secure, continuous welds.
1. Minimum 24 inch wide at roof areas subject to foot traffic around mechanical equipment on roofing and as indicated on drawings.

3.9 METAL AND MEMBRANE CLAD METAL FLASHINGS

- A. Verify metal flashings are installed as recommended by roofing manufacturer, FM Loss Prevention Data Sheets, and as required to make watertight.

- B. Make membrane clad metal flashings watertight with seamless heat welded transitions from membrane roofing to metal flashing at all membrane clad metal flashings provided in this section and formed and installed as specified Division 07 Section "Sheet Metal Flashings and Trim".

3.10 ROOFING ACCESSORIES

- A. Roof Drains and Overflow Drains: Sumped roof drain with clamping ring. Coordinate with Division 15 for tie into interior storm water lines.
- B. Roof/ Equipment Curbs: Coordinate with Section 07720.
- C. Install traffic pads in locations indicated in the Drawings.

3.11 FIELD QUALITY CONTROL

- A. Manufacturers Field Services: Perform inspections by manufacturers authorized technical representative during interim and completion of roofing work of this Section. Note deficiencies and promptly make oral and written report to Contractor and Architect.
- B. Owner's Inspection Services: Owner will engage an exterior envelope inspection service to observe and inspect the roofing installation work.
- C. The Applicator shall check all welded seams for continuity using a rounded screwdriver.
- D. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark gray material from the underside of the top membrane.
- E. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Architect, Design Builder or Manufacturer's representative.
- F. A minimum of one inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day.
- G. Correct welds display failure from shearing of the membrane prior to separation of the weld.
- H. The Architect or Owner may take seam cut test samples randomly during application. The contractor shall fully cooperate and repair test samples and identified deficiencies promptly.
- I. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

3.12 ADJUSTING AND CLEANING

- A. Correct identified defects and irregularities. Make adjustments as required for watertight installation.
- B. Replace work damaged prior to completion Project at no additional cost to Owner.

- C. Leave installations clean and premises free from residue and debris from work of this Section.

3.13 PROTECTION

- A. Make provisions to protect new and existing work to remain.
- B. Protect roofing system from traffic, storage of materials, and other potentially damaging conditions. Correct damaged roofing systems.

END OF SECTION 075410

SECTION 075556 - PLAZA ROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of plaza roofing systems
 - 1. Insulation
 - 2. Protection course
 - 3. Roof membrane
 - 4. Drainage Course / Air Layer
 - 5. Cover Board
 - 6. All miscellaneous metals as detailed on drawings
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 07 Section "Sheet Metal Flashing and Trim" for flashings and trims.
 - 3. Division 07 Section "Roof Pavers" for concrete roof pavers and pedestals.
 - 4. Division 22 Sections for Roof Drains.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM).
- B. Canadian General Standards Board, CGSB-37.50-M89, Standard for Asphalt, Rubberized, Hot Applied, for Roofing and Waterproofing.
- C. Underwriters Laboratories (UL) Class A.

1.4 DEFINITIONS

- A. Protected Membrane Roofing System – a roofing system installed with the waterproofing membrane installed directly on the deck and beneath moisture resistant insulation.

1.5 SYSTEM DESCRIPTION

- A. Furnish and install a completed membrane roof assembly including surface conditioner, Monolithic Membrane and flashings, protection course, and insulation.

1.6 SUBMITTALS

- A. Certification from an approved independent testing laboratory experienced in testing rubberized asphalt material, that the material meets the CGSB-37.50-M89 standard for rubberized asphalt membranes, including applicable ASTM procedures.
- B. Certification showing full time quality control of production facilities responsible for the manufacture of the rubberized asphalt and that each batch of material is tested to insure conformance with the manufacturers published physical properties.
- C. Certification showing that all components of the green roof assembly are being supplied and warranted by a single-source manufacturer.
- D. Evidence that the roof membrane assembly is currently Class A listed with Underwriters Laboratories.
- E. Evidence that the extruded polystyrene insulation if used is free from CFC's.
- F. The plant manufacturing the rubberized asphalt material shall have ISO 9001-2000 approval as evidenced by a notarized copy of the official certificate.
- G. Provide product data on all components of the plaza roof assembly.

1.7 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Cut sheets for each roofing material that includes information regarding the Solar Reflectance Index (SRI), tested in accordance with ASTM 1980 requirements. If SRI information is not available, information must be provided for both the emissivity and solar reflectance values.

1.8 QUALITY ASSURANCE

- A. The Roofing/Waterproofing Contractor shall demonstrate qualifications to perform the work of this Section by submitting the following documentation:
 - 1. Certification or license by the membrane manufacturer as a locally based, authorized applicator of the product the installer intends to use, for a minimum of five (5) years.
 - 2. List of at least three (3) projects, satisfactorily completed within the past five (5) years, of similar scope and complexity to this project. Previous experience

submittal shall correspond to specific membrane system proposed for use by applicator.

- B. All components of the "Plaza Roofing" system shall be single source from the system manufacturer.
- C. The rubberized asphalt membrane product shall contain an inert clay filler and crumb rubber to enable the product to be resistant to acids (fertilizers, building washes and acid rain) and maintain membrane thickness during application.
- D. Membrane Manufacturer shall have available an in-house technical staff to assist the contractor, when necessary, in application of the products and final inspection of the assembly.
- E. Membrane Manufacturer Qualifications: Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:
 - 1. Membrane Manufacturer shall show evidence that the specified rubberized asphalt has been manufactured by the same source for fifteen (15) years and successfully installed on a yearly basis for a minimum of fifteen (15) years on projects of similar scope and complexity.
 - 2. Membrane Manufacturer shall not issue warranties for terms longer than they have been manufacturing their hot fluid rubberized asphalt membrane.
- F. Pre-Construction Conferences. The manufacturer will meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the roofing assembly.
- G. Owner Representative Roofing Inspection: The Owner may contract with a separate roofing inspector to review daily installation as quality control per Section 01400. Coordinate work schedule and provide notice, to the Owner, no less than of 24 hours in advance of all roof related work.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original unopened containers of packaging clearly labeled with manufacturer's name, brand name, instruction for use, all identifying numbers, and U.L. labels.
- B. Materials shall be stored in a neat, safe manner, not to exceed the allowable structural capacity of the storage area.
- C. Store materials in a clean, dry area protected from water and direct sunlight.
- D. Store all adhesives at temperatures between 60°F (15.5°C) and 80°F (26.6°C). If exposed to lower temperatures, restore materials to 60°F (15.5°C) minimum temperature before using.

1.10 PROJECT CONDITIONS

- A. Application of the membrane shall not commence nor proceed during inclement weather. All surfaces to receive the membrane shall be free of water, dew, frost, snow and ice.
- B. Application of membrane shall not commence nor proceed when the ambient temperature is below 0°F (-17.7°C).
- C. Preparation and application of membrane shall be conducted in well ventilated areas.
- D. Over its service life, do not expose membrane or accessories to a constant temperature in excess of 180°F (82°C) (i.e., hot pipes and vents or direct steam venting, etc.).
- E. Adhesives contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near an open fire. Do not use in confined areas without adequate ventilation. Consult container or packaging labels and Material Safety Data Sheets (MSDS) for specific safety information.
- F. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat, etc.) to come in contact with the roof membrane. Any exposure to foreign materials or chemical discharges shall be presented to membrane manufacturer for evaluation to determine any impact on the roof membrane assembly performance.
- G. Ballasting requirements vary depending on height of roof deck, parapet height, and design wind speed based upon location of building. CONTACT Hydrotech for ballasting recommendations.
- H. General Contractor shall assure that adequate protection is provided after installation so other trades do not damage membrane.

1.11 WARRANTY

- A. Upon completion of the work, the contractor shall supply the owner with a single-source warranty of U.S. origin direct from the manufacturer.
- B. Each warranty varies in scope and terms. Contact Hydrotech for exact warranty terms and conditions to meet the specific project requirements.
 - 1. Total System Warranties; covers components of the plaza roof assembly, including membrane, flashing, and insulation, and pavers. Includes removal and replacement of the pavers when supplied by and installed per Hydrotech's requirements.
 - a. Duration of Membrane/Flashing: 20-year (watertight condition)
 - b. Duration of Insulation: 20-year (80% of original thermal value; remain on the deck withstanding wind speeds not to exceed 70 mph)
 - c. Duration of Pavers: 10-year (will not crack, split or disintegrate due to freeze-thaw)

PART 2 - PRODUCTS

2.1 GENERAL

- A. Refer to Article "System Description" in Part 1: All components shall be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity. Provide roofing system from one of the following listed Manufacturer, or other manufacturers submitted and approved via substitution request a minimum of 10 days prior to Bid.
1. Manufacturer: American Hydrotech, Inc., 303 East Ohio Street, Chicago, Illinois 60611-3318, 800-877-6125 or 312-337-4998. FAX: 312-661-0731. Web Site: <http://www.hydrotechusa.com>
 2. Alternate Manufacturer: Soprema 310 Quadral Drive , Wadsworth, Ohio 44281. 800-356-3521. Web Site: www.soprema.us
 - a. Alternate product: Soprema Colphene H-EV, with all associated system components.
 3. *Alternate Manufacturer: Carlisle Coatings & Waterproofing 800-527-7092 (Addendum 1)*
 - a. *Alternate product: Carlisle Waterproofing CCW-500R*
 4. *Alternate Manufacturer: Barrett Company, Millington, NY 07946 800-647-0100 (Addendum 3)*
 - a. *Alternate product: Ram-Tough 250 Rubberized Asphalt Membrane*

2.2 MATERIALS

A. Membrane

1. Membrane shall be a hot, fluid applied, rubberized asphalt membrane meeting the CGSB-37.50-M89 standard and other pertinent physical properties:
 - a. American Hydrotech, Inc., Monolithic Membrane 6125EV□ (minimum 25% post-consumer recycled-content)

<u>PROPERTY</u>	<u>TEST METHOD</u>	<u>TYPICAL RESULT</u>
Flash point	ASTM D-92 CGSB-37.50-M89	<500°F* (260°C)
Penetration (50°C)	ASTM D-5329 CGSB-37.50-M89	98 mm @77°F (25°C) 187 mm @122°F

Flow (60°C)	ASTM D-5329 CGSB-37.50-M89	1.0 mm @ 140°F
Toughness	CGSB-37.50-M89	16.0 Joules
Ratio of Toughness to Peak Load	CGSB-37.50-M89	0.069
Water Vapor Permeability	ASTM E-96, PROCEDURE E CGSB-37.50-M89	0.3 ng/Pa(s)M ²
Water Absorption	CGSB-37.50-M89	.11 gram weight gain
Low Temperature Flexibility (-25°C) cracking	CGSB-37.50-M89	No delamination, adhesion loss, or
Low Temperature Crack Bridging Capability Heat Stability	CGSB-37.50-M89 CGSB-37.50-M89	No cracking, adhesion loss, or splitting No change in viscosity, penetration, flow or low temperature flexibility
Viscosity	CGSB-37.50-M89	11.0 seconds
Water Resistance (5 days/50°C) emulsification,	CGSB-37.50-M89	No delamination, blistering, or deterioration
Softening Point	ASTM D-36	180°F (82°C)
Elongation	ASTM D-5329	1000% minimum
Resiliency	ASTM D-3407	40% minimum
Bond to Concrete	ASTM D-3407	Pass 0°F (-18°C)
Acid Resistance	ASTM D-896 Procedure 7.1 (N-8)	Pass-50% Nitric Acid -50% Sulfuric Acid
Resistance to Hydrostatic Pressure	ASTM D-08.22 Draft 2	100 psi (equals 231 foot of head water)
Resistance to Salt Water emulsification	ASTM D-896 similar 20% sodium chloride sodium carbonate	No delamination, blistering, or deterioration

	calcium chloride	
Resistance to Fertilizer emulsification	ASTM D-896 similar undiluted, 15/5/5, nitrogen/phosphorus/ potash	No delamination, blistering, or deterioration
Resistance to Animal Waste	3-year exposure	No deterioration
Solids Content		100%-no solvents
Shelf Life		10 years (sealed)
Specific Gravity		1.23 + .02

*102°F more than the application temperature recommended by the manufacturer.

B. Reinforcing:

1. 60-mil (1.5 mm) thick, uncured neoprene (heavy duty) reinforcing sheet. - American Hydrotech, Inc., Flex Flash UN□

C. Flexible Flashing:

1. 157-mil (4 mm) thick, torch-grade, modified asphalt, reinforced flashing membrane. - American Hydrotech, Inc., Flex-Flash MB□

D. Protection/Cap Sheet:

1. American Hydrotech, Inc., Hydrocap 160 FR□

E. Adhesives/Sealant:

1. Contact adhesive to bond elastomeric flashing together. - American Hydrotech, Inc., Splicing Cement
2. Contact adhesive to bond elastomeric flashing to an approved substrate. - American Hydrotech, Inc., Bonding Adhesive
3. Sealant to seal elastomeric flashing seam edge. - American Hydrotech, Inc., Lap Sealant

F. Drainage Course / Air Layer:

1. American Hydrotech, Inc. Hydrodrain 300®

G. Insulation:

1. At Pavers and Pedestals – Dow Plazamate, R-38.

H. Cover Board:

1. Provide ½ inch Glass mat faced Roof Board, Dens Deck Prime or equal, on stud wall as backer for monolithic waterproof membrane.

2.3 RELATED MATERIALS

- A. Metal counterflashing is required at all vertical membrane terminations.

PART 3 - EXECUTION

3.1 INSPECTION

- A. The roofing contractor shall examine all surfaces to receive the roofing assembly to verify it is acceptable and proper for the application of the membrane. Refer to American Hydrotech's Pre-Installation & Application Guidelines.
- B. The roofing contractor shall not proceed with the installation of the roof membrane assembly until all roof defects have been corrected.

3.2 PREPARATION

A. Substrate Cleaning:

1. Install fiber glass mat board (1/2" Primed Dens Deck or as approved by membrane manufacturer) over solid plywood structural deck. Extend fiberglass mat board up perimeter walls to receive roofing membrane flashings. Fiber glass mat board surface is to be clean, dry, free of voids, and sharp protrusions.
2. Thoroughly sweep the substrate which is to receive the roof membrane.
3. Substrate shall also be blown clean using an air compressor to remove any remaining loose debris.
4. Final check to determine if substrate has been properly cleaned is to apply a test patch of Monolithic Membrane 6125□ to the surface and check its adhesion.

3.3 INSTALLATION

A. Membrane Preparation:

1. The membrane shall be heated in double jacketed, oil bath or hot air melter with mechanical agitation, specifically designed for the preparation of a rubberized asphalt membrane.
2. Heat membrane until membrane can be drawn-free flowing at a temperature range between 350°F (176°C) and 375°F (190°C).

B. Detailing/Flashing:

1. All detailing and flashing shall be done in accordance with the manufacturer's standard guideline details.
2. All detailing and flashing shall be completed before installing the membrane over the field of the substrate.

C. Membrane Application:

1. Apply the rubberized asphalt membrane at a rate to provide a continuous, monolithic coat of 90 mil minimum (approximately 2.3 mm), into which is fully embedded a layer of the spunbonded polyester fabric reinforcing sheet, followed by another continuous monolithic coat of membrane at an average thickness of 125 mil (approx. 3.2 mm). Total membrane thickness is to be 215 mils average (approx. 5.5 mm), 180 mils minimum.
2. Overlap fabric reinforcing sheet 1-2 inches (25.4 mm - 50.8 mm) with membrane between sheets.

D. Separation/Protection course shall be installed as follows:

1. Embed the Hydroflex 30 & HRII separation/protection course into the membrane while it is still hot to insure a good bond. Installation of a separation course is necessary in order to carry out the water test.
 - a. Overlap adjoining sheet edges (dry) a minimum of 2"-3" (50.8 mm - 76.2 mm) to insure complete coverage.

3.4 WATER TEST

- A. The roof area or portions thereof shall be leak tested by means of electronic testing or by ponding water at a minimum depth of 2" (50.8 mm) for a period of 48 hours to check the integrity of the membrane installation.
- B. VERIFY that the structure can support the deadload weight of a watertest before testing.
- C. If leaks should occur the water shall be drained completely and the membrane installation repaired.
- D. Retest roof at no additional cost to the Owner.

END OF SECTION 07556

–SECTION 076200 – SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:

1. ~~Manufactured reglets.~~
2. Formed counter flashing; and base flashing
3. Formed roof drainage system.
4. Formed sheet metal downspouts.
5. Formed low-slope roof flashing and trim.
6. Formed wall flashing and trim.
7. Formed ~~window sill flashing~~ pan-opening(s) flashing
8. Formed equipment support flashing.
9. Fabrication and installation of roof flashing elements integrated with Division 07 Section “Thermoplastic Membrane Roofing”.
10. Miscellaneous sheet metal flashings.

- B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for installing reglets..
2. Division 04 Section "Unit Masonry Assemblies" for installing through-wall flashing, reglets, and other sheet metal flashing and trim.
3. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
4. Division 07 Section "Formed Metal Wall Panels" for factory-formed metal wall panels and flashing and trim not part of sheet metal flashing and trim.
5. Division 07 Section “Thermoplastic Membrane Roofing” for roofing accessories installed integral with roofing membrane as part of roofing-system work.
6. Division 07 Section “Roof Accessories” for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
7. ~~Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.~~
8. ~~Division~~
9. ~~Division 04 Section "Unit Masonry Assemblies" for mockup that requires work of this section. (Addendum 2)~~

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

~~7.~~

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 - 1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft.: 60-lbf/sq. ft. perimeter uplift force, 90-lbf/sq. ft. corner uplift force, and 30-lbf/sq. ft. outward force.
- C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 12 inches long. Include fasteners and cleats.
 - 2. Accessories: Full-size Sample.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- 2. _____

1.5 1.6 QUALITY ASSURANCE

A.D. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.6 1.7 DELIVERY, STORAGE, AND HANDLING

A.E. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B.F. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C.G. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 1.8 COORDINATION

A.H. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
2. Exposed Finishes: Apply the following coil coating:

- a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- 1) Fluoropolymer 3-Coat System: Manufacturer's 3-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 621.

- b. Color: Manufacture Standard and Custom colors per drawings.

B. Stainless Steel Sheet: ASTM 240 /A240M, Type 304. No. 2D dull, cold rolled finish.

2.2 UNDERLAYMENT MATERIALS

A. Polyethylene Sheet: 6-mil- thick polyethylene sheet complying with ASTM D 4397.

- B. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.
- D. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- C. Solder for Zinc: ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

~~2.4~~ ~~MANUFACTURED SHEET METAL FLASHING AND TRIM~~

- ~~A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.~~
 - ~~1. Available Manufacturers or approved:~~
 - ~~a. Fry Reglet Corporation.~~
 - ~~2. Material: Prefinished galvanized steel, 24 gauge unless otherwise noted.~~
 - ~~3. Surface Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.~~
 - ~~4. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.~~
 - ~~5. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.~~
 - ~~6. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.~~

2.52.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Sheet Metal: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

G. Gutters: Fabricate in 10' sections to match profiles shown on the Drawings from the following material:

~~Fabricate gutters from prefinished galvanized steel in continuous roll form lengths, of 50 feet maximum, between expansion joints. Joints in gutters not permitted if gutter length is less than 50 feet long.~~

1. Stainless Steel: 22 gauge thick, location per drawings

1.2. Accessories: Furnish end caps, corner units, downspout outlets, support brackets, spacers, expansion joint covers, baffles and other necessary accessories as required. Furnish from same material as gutters.

~~2. Prefinished coil-coated galvanized steel: Color as indicated on Drawings.~~

~~3. Expansion Joints: Butt type with cover plate.~~

4. Gutter Profile and Gauge: As indicated on Drawings per drawings.

4.H. Downspouts: Schedule 80 PVC as indicated on Drawings. Furnish with metal hangers and anchors as detailed on Drawings.

~~B.~~ ~~Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers and anchors as detailed on Drawings.~~

~~1. Fabricate downspouts from the following material:~~

~~a. Prefinished coil-coated galvanized steel: Thickness as detailed on Drawings.~~

~~2. Metal hangers: Prefinished, Metallic-Coated Steel: Thickness as detailed on Drawings.~~

~~C.~~ ~~Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated complete with outlet tubes, exterior flange trim, and built-in overflows.~~

~~1. Fabricate conductor heads from the following material:~~

~~a. Prefinished, Metallic-Coated Steel: 0.048 inch thick.~~

2.72.5 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

~~A.~~ ~~Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch long, but not exceeding 10-foot long, sections. Furnish with 6-inch wide, joint cover plates.~~

~~1. Joint Style: Butt, with 12-inch wide, concealed backup plate.~~

~~2. Fabricate from the following materials:~~

~~a. Prefinished coil-coated galvanized steel: 0.0336 inch thick.~~

B.A. Copings: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to

support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners and tees, seal, ~~and solder or weld~~ watertight.

1. Coping Profile: As indicated on Drawings.
2. Joint Style: Butt, with 12-inch- wide, concealed backup plate.
3. Fabricate from the following materials:
 - a. Prefinished coil-coated galvanized steel: 0.0336 inch thick.

~~C.B.~~ Base Flashing, counterflashing, flashing receivers and roof-penetration flashings: Fabricate from the following materials:

1. Prefinished coil-coated galvanized steel: 0.0336 inch thick.

2.82.6 WALL SHEET METAL FABRICATIONS

A. Openings Flashing in Frame Construction: Fabricate head, sill and similar flashings as detailed. Form head and sill flashing with end dams of height detailed. Fabricate from the following material:

1. Prefinished coil-coated galvanized steel: 0.0336 inch thick.

2.92.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Prefinished coil-coated galvanized steel: 0.0336 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 - 1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and butyl sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- G. Seal joints with elastomeric sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.
 - 1. Do not solder prepainted, metallic-coated steel sheet.
 - 2. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Gutters: Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored straps spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - 1. Loosely lock straps to front gutter bead and anchor to rear gutter wall as indicated on Drawings.
 - 2. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps.
- C. Downspouts: Install downspouts using hangers and hardware with spacing as indicated on Drawings.
 - 1. Connect downspouts to underground drainage system indicated.

~~D. Conductor Heads: Anchor securely to wall with elevation of conductor head as indicated on Drawings.~~

~~E. Expansion Joint Covers: Install expansion joint covers at locations and of configuration indicated. See Drawings.~~

3.4 ROOF FLASHING INSTALLATION

~~A. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.~~

- ~~1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at centers as recommended by roofing manufacturer.~~

~~B.A. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.~~

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

~~B. Reglets: Installation of reglets is specified in Division 4 Section "Unit Masonry Assemblies."~~

~~C. Opening Flashing in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.~~

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 076616 - ROOF PAVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section Includes:
1. Precast concrete roof pavers installed on pedestals.
 2. Pedestals, including leveling shims and adjustable pedestals or screwjack pedestals.
 3. Clear sealer.
- B. Related Sections include the following:
1. Division 01 Section "Sustainable Requirements."
 2. Division 07 Section "Plaza Roofing System" for waterproof membrane below pavers.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.2 SUBMITTALS

- A. Layout Drawings: Submit layout drawings showing typical installation of pavers, including dimensions, field cutting, and other pertinent information. Provide details of adjustable pedestals, including those pedestals where height exceeds standard height of fixed pedestals.
- B. Product Data: Submit manufacturer's product data on the following items verifying compliance with specified requirements.
1. Precast concrete pavers.
 2. Pedestals, including shims.
 3. Sealer.
- C. Certification: Submit written certification from the pedestal manufacturer stating that the pedestal assembly will distribute the loads (weight of precast concrete paver and anticipated live loads) without causing structure failure or depressions in the roof cover board or roof insulation.
- D. Samples: Submit the following samples:
1. Three (3) sets of precast concrete pavers, 6 inches square in selected color; include the full range of colors to be expected in the completed Work; each set shall contain 3 pavers showing lightest and darkest colors to be expected. Architect's review will be for color and texture only. Seal pavers with clear water repellent sealer, two coats; seal only half of each sample.
 2. Samples of fixed height pedestals and screw jack pedestals.

- E. Contract Closeout Submittal: Submit the following at time of Project Closeout; include data in "Products Manual" specified in Section 01784.
 - 1. Manufacturer's data on paver, including color pigment, type of aggregates, and finish.
 - 2. Type of pedestals.
 - 3. Type of clear sealer.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Qualifications (Pavers): Minimum of 5 years experience in the manufacturing of precast concrete units and fixed and adjustable pedestals of quality specified.
- B. Single Source: Obtain precast concrete pavers and pedestals from one manufacturer for the entire Project. All pedestals and accessories shall be obtained from one manufacturer to ensure total system integrity.
- C. Installer's Qualifications: Engage experienced Installers who have completed precast concrete paver installations similar in design and extent to that indicated for Project, and who have a minimum of 3 years experience.
- D. Tolerances:
 - 1. Fabrication Tolerances: Permissible variations in dimensions shall not differ by more than plus or minus 1/16 inch in width, height, length, thickness, concave or convex deflection.
 - 2. Installation Tolerances: Do not exceed 1/8 inch in 10 feet in any direction from level or slopes indicated when tested with a 10 foot straightedge.
- E. Acceptability of Appearance: The following list of finish defects shall be considered as unacceptable and shall be replaced with a new unit at no additional cost.
 - 1. Pavers not being within the approved color range.
 - 2. Non-uniformity of surface texture.
 - 3. Foreign material embedded in the face.
 - 4. Shrinkage cracks.
 - 5. Ragged or irregular edges. Minor defects incidental to the usual method of manufacturer or slight chipping resulting from handling and delivery may be acceptable provided such defects are minor in scope and do not affect the overall appearance of the work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver precast pavers on wood pallets, covered with non-staining waterproof membrane; allow air to circulate around precast units.

- B. Handle precast units to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of precast units with wood or other rigid materials. Lift with wide-belt type slings wherever possible; do not use wire ropes or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slides.

1.5 PROJECT CONDITIONS

- A. Review installation procedures, and coordinate with other work, and others whose work will be affected by the precast units work.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE PAVERS

- A. Type: Modular Paver, light sandblast finish, machine made paver meeting the following requirements:
 - 1. Size: 12 inches by 24 inches by 2 inches thick.
 - 2. Color: As selected from manufacturer's standards.
 - 3. Finish: Provide manufacturer's standard light shot finish.
 - 4. Edges: Manufacturer's standard chamfer on top edges (four sides).
 - 5. Weight: Minimum 25 pounds per square foot.
- B. Physical Properties:
 - 1. Compressive Strength: Average compressive strength shall be not less than 8,000 psi, with no individual unit less than 7,300 psi at 28 days when tested per ASTM C140.
 - 2. Water Absorption: Average water absorption shall not be greater than 5 percent with no individual unit greater than 7 percent when tested per ASTM C140.
 - 3. Freeze/Thaw: Pavers shall meet the freeze/thaw tests in accordance with Section 8 of ASTM C67. Specimens when tested shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subjected to 50 cycles of freezing and thawing.
- C. Quality Standard Product: Hanover Prest Roof and Plaza Pavers.
- D. Other Approved Manufacturers: The following precast concrete paver manufacturers are approved, subject to meeting the requirements specified: Wausau Tile and Abbotsford Concrete Products Ltd.

2.2 MATERIALS FOR PAVERS

- A. Portland Cement: ASTM C150, Type I. White and gray colors may be required to achieve desired finish color. Use only one brand for each type of cement.
- B. Aggregates: Normal weight type conforming to ASTM C33, except grading limits shall be as recommended by the paver manufacturer.

- C. Color Pigments: Synthetic mineral oxide, sunlight and alkali-fast, conforming to ASTM C979, and certified to be resistant to lime and other alkalis and be compatible with other admixtures which are used in pavers.
- D. Provide shop applied sealer.

2.3 PEDESTALS AND ACCESSORIES

- A. Type: High density polypropylene pedestals, or approved equal allowing for 3/16 inch spacing between paver units. Pedestal system shall consist of the following:
 - 1. Fixed height pedestals, 3/8 inch high with a base bearing surface of 16 square inches.
 - 2. Standard top leveling disks with incremental adjustment from zero to 5/8 inch per foot; standard base leveling disks to compensate for substrate slope of up to 1 inch per foot; leveling disks shall be high density polypropylene.
 - 3. Provide manufacturer's standard PVC pad shims, 1/16 inch thick.
 - 4. Provide manufacturer's standard screw jack pedestals where height from top of roof substrate to underside of paver exceeds height required for fixed pedestals utilizing shims and/or leveling disks.
 - a. Screw jack pedestals shall be fabricated from high density polypropylene.
 - b. Base bearing surface shall be minimum 50 square inches with rotating base having minimum 3/16 inch wall thickness.
 - c. Top unit, 5/32 inch thick with bearing surface area of minimum 26 square inches.
- B. Quality Standard Product: Hanover Elevator Pedestal system.

2.4 SEALER

- A. Sealer Type and Manufacturer: ProSoCo, Inc. "Consolideck Saltguard", or approved equal siloxane type formulation, having minimum solids of 10 percent and which produces a "natural" appearance when dry. Shop apply.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of precast concrete pavers will occur with Installer present. Verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved. Commencement of work constitutes acceptance of conditions.

3.2 PROTECTION

- A. General: The roofing system shall be fully protected from damage during paver installation. Do not set pavers directly on roofing system without providing protection sheet. Method of protection shall be the responsibility of the Installer.

3.3 INSTALLATION, GENERAL

- A. Do not use precast units with chips, cracks, voids, stains, or other defects which might be visible in the finished work. Before setting precast units, examine units for conformance with specified fabrication tolerances and appearance standards; units not meeting requirements shall be rejected.
- B. Use power driven masonry saws for cutting of pavers; provide clean, sharp, unchipped edges; cut to provide pattern indicated and to fit adjoining work neatly; accurately form corners. All cut pavers which abut other pavers shall have the top edges cut to maintain the 1/4 inch chamfer edges.
- C. Maintain surface plane for finish pavers not exceeding a tolerance of 1/8 inch in 10 feet when tested with a 10 foot straightedge.
- D. Clean sub-base to remove dirt, dust, debris, and loose particles.

3.4 PAVER INSTALLATION

- A. General: Install pavers on pedestals following layouts and patterns as indicated on drawings. After starting point and finish elevations have been determined, the pedestal system elevation (less paver thickness) shall be established and marked around the perimeter using a laser leveling device.
 - 1. Follow pedestal manufacturer's recommendations for laying out pedestals to ensure a square layout.
 - 2. Set pavers one row at a time with all joints in alignment and uniform in both directions.
 - 3. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units where full units are shown on drawings.
- B. Place pedestals with projecting ribs facing upwards to insure uniform 3/16 inch paver joint spacing. Adjust pedestals so that precast paver has bearing on all four (4) corners. All installed pavers shall be free from "rocking".
 - 1. Shim spacers with leveling plates as required to meet the installation tolerances as specified. Rubber pedestals may be interlocked and stacked a maximum of three (3) high, unless otherwise recommended by manufacturer.
 - 2. Provide adjustable paver pedestals as required to achieve a uniform installation. Do not extend screw cylinder beyond the minimum engagement of the threads. Overall height of piers shall be as required to maintain proper elevation within plus or minus 1/8 inch in 10 feet.

3. Provide 1 inch by 4 inch by 1/4 inch thick dense neoprene pads where pavers abut vertical surfaces. Adhesively apply pads to pavers; provide a minimum of 3 pads per paver, equally spaced.

3.5 CLEANING

- A. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective pavers. Remove and replace all defective pavers as directed, or pavers which do not match adjoining pavers as intended.

3.6 SEALING

- A. General: Surfaces shall be completely dry and clean to permit uniform penetration. Seal all pavers.
- B. Application: Apply sealer to pavers in one application in accordance with manufacturer's directions using roller to ensure thorough saturation. Do not dilute or alter material.
 1. Before applying sealer to an entire area, do a test sample with 24 hour cure time to determine best method of application and coverage rate. Pavers may require a second application depending upon surface porosity; allow a minimum of 24 hours between applications.
 2. Do not allow sealer to stand in puddles on paver surface; apply sealer so that treated surfaces remain wet for a few minutes before penetrating; broom out all puddles.

END OF SECTION 077600

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Roof curbs.
 - 2. Equipment supports.
 - 3. Roof Hatches.
- B. Related Sections include the following:
 - 1. Division 05 Section "Metal Fabrications" for metal vertical ladders for access to roof hatches.
 - 2. Division 05 Section "Pipe and Tube Railings" for safety railing systems not attached to roof-hatch curbs.
 - 3. Division 06 Section "Rough Carpentry" for wood nailers.
 - 4. Division 07 Section "Thermoplastic Membrane Roofing" for roof membrane systems.
 - 5. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.
- B. Store off ground and handle to keep clean, dry and protected from damage due to weather and construction activities.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coated.

OR
 - 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 (Class AZM150) coated.

2.2 MISCELLANEOUS MATERIALS

- A. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- B. Polyethylene Sheet: 6-mil- (0.15-mm-) thick, polyethylene sheet complying with ASTM D 4397.
- C. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 - 1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

- D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

2.3 EXPOSED FINISHES

- A. High-Performance Organic Finish (2-Coat Fluoropolymer): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 - 1. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements in AAMA 2605, except as modified below:
 - a. Humidity Resistance: 2000 hours.
 - b. Salt-Spray Resistance: 2000 hours.

2.4 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units with integral spring-type vibration isolators and capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AES Industries, Inc.
 - b. Curbs Plus, Inc.
 - c. Custom Solution Roof and Metal Products.
 - d. Greenheck Fan Corporation.
 - e. LM Curbs.
 - f. Metallic Products Corp.
 - g. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - h. Pate Company (The).
 - i. Roof Products, Inc.
 - j. Thybar Corporation.
 - k. Vent Products Co., Inc.
- B. Material: Zinc-coated (galvanized) steel sheet, 0.052 inch (1.32 mm) thick.
 - 1. Finish: Two-coat fluoropolymer.
 - 2. Color: As selected by Architect from manufacturer's full range.

C. Construction:

1. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick cellulosic-fiber board insulation.
2. Liner: Same material as curb, of manufacturer's standard thickness and finish.
3. Factory-installed wood nailer at top of curb, continuous around curb perimeter.
4. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
5. Fabricate curbs to minimum height of 12 inches (300 mm) unless otherwise indicated.
6. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange.
7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.

2.5 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints, with an integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
1. Load Requirements: Per Mechanical Equipment Schedule.
 2. Material: Galvanized steel sheet, 0.052 inch thick or as required by loads imposed.
 3. Factory-install continuous wood nailers 3-1/2 inches wide at tops of equipment supports.
 4. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.
 5. Fabricate units to minimum height of 8-inches above finished roof, unless otherwise indicated.
 6. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.6 ROOF HATCHES

- A. Basis of Design Product: The design for the roof access hatch is based on "The Bilco Company", Models NB (ships ladder access). Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved:
1. Babcock Davis
 2. J.L. Industries
 3. Milcor Inc.
 4. Nystrom Inc.
- B. Fabricate roof hatches with insulated double-wall lids and insulated double-wall curb frame with integral equipment support mounting flange and lid frame counterflashing. Fabricate with

welded or mechanically fastened and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.

1. Loads: Fabricate roof hatches to withstand 40-lbf/sq. ft. external loads.
2. Type and Size:
 - a. Single-leaf lid, Type NB, 30 by 84 inches.
 - b. Single-leaf lid, Type NB, 30 by 96 inches.
3. Locations: As shown on Roof Plans.
4. Curb and Lid Material: Galvanized steel sheet, 0.079 inch thick.
 - a. Finish: High-performance organic coating.
5. Insulation: Glass-fiber Polyisocyanurate board.
6. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.
7. Exterior Curb Liner: Manufacturer's standard metal liner of same material and finish as metal curb.
8. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
9. Hardware: Galvanized steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.
10. Hatchway Safety Rail System: Bilco "Ladder Up" Hatch Safety Post, Model LU-4:
 - a. Material and Finish: Mill finish aluminum.
 - b. Tubular post shall lock automatically when fully extended.
 - c. Safety post shall have controlled upward and downward movement.
 - d. Release lever shall disengage the post to allow it to be returned to its lowered position.
 - e. Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
 2. Verify dimensions of roof openings for roof accessories.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof

accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.
- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Roof Curb and Equipment Support Installation:
 - 1. Set roof curb or equipment support so top surface of roof curb is level.

3.3 TOUCH UP

- A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 9 painting Sections.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 077200

SECTION 078413 – THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items:
 - 1. Floors.
 - 2. Roofs.
 - 3. Walls and partitions.
 - 4. Smoke barriers.
 - 5. Construction enclosing compartmentalized areas.
- B. Related Sections:
 - 1. Division 03 Section “Cast-in-Place Concrete” for construction of openings in concrete slabs and walls.
 - 2. Division 21 Sections specifying fire-suppression piping penetrations.
 - 3. Divisions 22 and 23 Sections specifying piping and duct penetrations.
 - 4. Divisions 25 through 28 Sections specifying cable and conduit penetrations.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building System.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor assemblies.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per UL 1479:

1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
 - c. Penetrations located in construction containing fire protection-rated openings.
 - d. Penetrating items larger than inches (100 mm) diameter nominal pipe size or 16 sq. in. (100 sq. cm) in overall cross sectional area.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

3. STC Rated Partitions: Where UL rated walls also have acoustical requirements, provide the STC properties of the submitted firestopping materials necessary to meet the acoustical requirements.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 1. Types of penetrating items.
 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
 - D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - E. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
 - F. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 LEED SUBMITTAL REQUIREMENTS:

- A. Complete the LEED VOC Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.
- B. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors" and experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
 - 2) ITS in its "Directory of Listed Products."
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated on Drawings that are available from the following manufacturers:
 - 1. A/D Fire Protection Systems Inc.
 - 2. DAP Inc.
 - 3. Firestop Systems Inc.
 - 4. Grace, W. R. & Co. - Conn.
 - 5. Hilti Construction Chemicals, Inc.
 - 6. Instant Firestop Mfg. Inc.
 - 7. International Protective Coatings Corp.
 - 8. Isolatek International.
 - 9. Nelson Firestop Products.
 - 10. NUCO Industries.
 - 11. RectorSeal Corporation (The).
 - 12. Specified Technologies Inc.
 - 13. 3M Fire Protection Products.
 - 14. Tremco.
 - 15. United States Gypsum Company.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:

- a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.
- C. Paintable Sealants: Provide paintable firestop sealants for locations that are visible in public spaces.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.
- L. Rock Wool Insulation: Non-combustible, lightweight, semi-rigid stone wool batt insulation to ASTM C665 Type 1, that provides fire resistance to ASTM E136 and sound control to ASTM E423.
 - 1. Manufacturer: ROXUL INC., 420 Bronte Street South, Suite 105, Milton, Ontario, L9T 0H9, Phone: 905-878-8474, Toll Free: 1-800-265-6878, e-mail: contactus@roxul.com,
 - 2.
 - a. Fire performance:
 - b.
 - 1) Non-combustibility: To ASTM E136.
 - 2) Surface Burning Characteristics: To ASTM E84.
 - 3) Flame spread: 0.
 - 4) Smoke developed: 0.
 - 5)
- M. Elastomeric Coating: Used in combination with Rock Wool Insulation to seal edge of floor and wall structure to building envelope systems at exterior margins of the building.
 - 1. 3M™ FireDam™ Spray 200, for providing up to 2-hour fire protection for through-penetration systems per ASTM E 814 (UL 1479) & CAN/ULC-S115.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

2.5 VOC LIMITS

- A. Refer to VOC limit tables in Section 018119 for VOC limits for products in this section.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems

immediately and install new materials to produce systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

1. Other third party testing agencies are acceptable provided that they are recognized by the appropriate code officials within the jurisdiction of this project, i.e.:

- a. (OPL) Omega Point Laboratories
- b. (ITS) Intertek Testing Services
- c. Other

B. Firestop Systems with No Penetrating Items:

1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 0001-0999.
2. Type of Fill Materials: One or more of the following:

- a. Latex sealant.
- b. Silicone sealant.
- c. Intumescent putty.
- d. Mortar.
- e. Rock wool w/ elastomeric coating.

C. Firestop Systems for Metallic Pipes, Conduit, or Tubing:

1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 1001-1999.
2. Type of Fill Materials: One or more of the following:

- a. Latex sealant.
- b. Silicone sealant.
- c. Intumescent putty.
- d. Mortar.

D. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing:

1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 2001-2999.
2. Type of Fill Materials: One or more of the following:

- a. Latex sealant.
- b. Silicone sealant.
- c. Intumescent putty.
- d. Intumescent wrap strips.
- e. Firestop device.

E. Firestop Systems for Electrical Cables:

1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 3001-3999.

2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Silicone foam.
 - e. Pillows/bags.
- F. Firestop Systems for Cable Trays:
1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 4001-4999.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Pillows/bags.
 - e. Mortar.
- G. Firestop Systems for Insulated Pipes:
1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 5001-5999.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Intumescent wrap strips.
- H. Firestop Systems for Miscellaneous Electrical Penetrants:
1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 6001-6999.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Mortar.
- I. Firestop Systems for Miscellaneous Mechanical Penetrants:
1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 7001-7999.
 2. Type of Fill Materials: One or both of the following:
 - a. Latex sealant.
 - b. Mortar.
- J. Firestop Systems for Groupings of Penetrants:
1. UL-Classified Systems: F-A; F-B; W-J; W-K; W-L; -- 8001-8999.
 2. Type of Fill Materials: One or more of the following:

- a. Latex sealant.
- b. Mortar.
- c. Intumescent wrap strips.
- d. Firestop device.
- e. Intumescent composite sheet.

END OF SECTION 078413

SECTION 079200 – JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

- A. The extent of each form and type of joint sealer is indicated on drawings and by provisions of this Section.
- B. The applications for joint sealers as work of this section include the following:
 - 1. Wall joints (exterior).
 - 2. Interior wall/ceiling & wall/floor joints.
 - 3. Other miscellaneous locations where materials meet in abutting conditions.
- C. Related Sections:
 - 1. Division 01 Section "Quality Requirements" for Mock-ups.
 - 2. Refer to Division 07 Sections for coping/roofing sealants; not work of this section.
 - 3. Refer to Division 08 Section "Glazing" for requirements; not work of this section.
 - 4. Refer to Division 09 Section "Gypsum Board Assemblies for acoustical sealant requirements; not work of this section.
 - 5. Refer to sections of Divisions 21-23 and 26-28 for joint sealers in mechanical and electrical work; not work of this section.
 - 6. *Division 04 Section "Unit Masonry Assemblies" for mockup that requires work of this section. (Addendum 2)*
- D. General Performance: Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required. Certified copies of independent lab test reports shall be provided to verify that products supplied meet specified performance characteristics.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver and stored packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage of contamination to materials by water, freezer, foreign matter or other causes.

1.5 JOB CONDITIONS

- A. Weather Conditions: Do not proceed with installation of liquid sealants under wet or unfavorable weather conditions. Install elastomeric sealants when temperature is above 40 degrees F and is in lower third of temperature range recommended by manufacturer for installation.

1.6 WARRANTIES

- A. Provide written 5 year warranty by installer specific to this project for each type of joint sealer used. Material warranty by manufacturer shall be provided for 20 years.

1.7 INSTALLER QUALIFICATIONS

- A. Installers shall have a minimum of 5 years of specialized experience in sealer applications.

PART 2 - PRODUCTS

2.1 CAULKING FOR INTERIOR USE

- A. Product: Acrylic latex base, capable of being painted.
- B. Manufacturer: A.C. Horn, Vulcatex of H.; Sonneborn, Sonolac; Bostik Siliconized Acrylic Latex, or approved.
- C. Color: Selected from manufacturer's standard color to best match adjacent materials.

2.2 SEALANT FOR EXTERIOR USE

- A. Vertical joints at doors, windows, etc. in concrete masonry, exposed steel channels, metal panels, trim and flashings: Exposure: NT - Joint Substrates: M, G, and A. Sealant Types: M. Grade: NS. Class 25. Acceptable Products Are: Bostik: "Chem-Calk 500," Bostik: "ChemCalk 505 Solvent Free," Sonneborn: "Sonolastic NP's," Tremco: "Pymeric Plus" or approved equal.
- B. Vertical joints in glass to glass to other non-porous/non-alkaline material: Exposure NT. Joint Substrates: G and O. Sealant Type S. Grade NS. Class 25. Acceptable Products Are: Dow "795," Sonneborn "Sonolastic Omniplus," Tremco "Spectrum II."
- C. Horizontal joints for expansion and joints between dissimilar materials/assemblies. Exposure: T. Joint Substrates M, A, and O. Sealant Type: M. Grade: P. Class 25. Acceptable Products Are: Tremco: "THC 900".

2.3 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Backer Rod: Provide compressible rod stock of closed cell polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, closed cell, nonabsorptive material as recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type that will not be deteriorated by sealant application temperature as indicated. Shall be nonabsorbent to liquid water and gas, non-out-gassing in un-ruptured state and with diameter 40% greater than the joint width.
- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back or joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable

2.4 MISCELLANEOUS MATERIALS

- A. Joint Primer/Sealer: Provide type of non-corrosive & non-staining joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
- B. Sealant Backer Rod (S-BR): Provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, closed cell, nonabsorptive material as recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type that will not be deteriorated by sealant application temperature as indicated.

2.5 VOC LIMITS

- A. Refer to VOC limit tables in Section 018119 for VOC limits for products in this section.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer must examine substrates, (joint surfaces) and conditions under which joint sealer work is to be performed, and must notify Contractor in writing of unsatisfactory conditions.
- B. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 JOINT PREPARATION

- A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substances which could

interfere with seal of gasket bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

- B. Priming: Apply primer to contract surfaces to be sealed in accordance with manufacturer's directions; apply proper primer compatible with sealant material; apply full strength and undiluted in uniform coating over surface. Prior to proceeding with sealing work, primer and seal representative joints of each type encountered on the project as selected by Architect and Owner; demonstrate adhesion and other performance characteristics for the inspection and approval of Architect and Owner prior to proceeding with work. Protect adjacent work from staining by primer or sealant. Mask as required.

3.3 INSTALLATION

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.
- B. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
- C. Joint Backing: Install backer rods and filler material in accordance with manufacturer's directions; provide in as long lengths as practicable; stretch and force into joints with proper tool; install to uniform depths as indicated. Install filler material in joints to receive sealant where joints are 1/2" or more in width and in joints to receive sealant where joint are 3/4" or more in depth. Install backer rods in all other joints to receive sealant.
- D. Sealing of Joints: Before applying the final sealing materials, replace any masking torn or damaged and verify that surfaces are properly primed and ready for application of the material.
- E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt. Apply material with tools and equipment designed for its application; filling all joints and voids solid, superficial pointing with skim bead will not be accepted. Leave all joints completely sealed watertight.
- F. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.4 CURE AND PROTECTION

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

- B. Upon completion remove and dispose of markings materials: remove any excess sealing materials, clean adjacent surfaces of any soil or stain resulting from sealing operations.

END OF SECTION 079200

SECTION 081113 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel doors.
2. Steel door frames.
3. Sidelight frames.
4. Borrowed-light frames.

B. Related Sections

1. Division 04 Section "Unit Masonry Assemblies" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Finish Hardware" for door hardware for hollow metal doors.
3. Division 08 Section "Glazing" for glazing assemblies to be installed in doors and frames.
4. Division 09 Section "Painting" for field painting hollow metal doors and frames.
5. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.

- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

- B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
2. For the following items, prepared on Samples about 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.

D. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

E. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 LEED SUBMITTAL REQUIREMENTS:

- A. Complete the LEED VOC Submittal Form as provided in Section 013323 – Submittal Procedures – LEED Submittals for products in this section.
- B. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10B, UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to finish of factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch-high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved:

1. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Steelcraft; an Ingersoll-Rand company.
4. Stiles.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Division 08 Section "Glazing."
- I. Grout: ASTM C476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143/M. Cement based grout only.
- J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Point 12, compounded for 15 mil dry film thickness per coat.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
 1. Design: Flush panel.
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

- a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu (1.057 K x sq. m/W) when tested according to ASTM C 1363.
 - 1) Locations: Exterior doors.
 3. Vertical Edges for Single-Acting Doors: Beveled edges, 1/8 inch in 2 inches (3 mm in 50 mm).
 4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
 5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from 14 gauge (0.067 inch, 1.7 mm) metallic-coated steel sheet.
 1. Fabricate frames with mitered or coped corners.
 2. Fabricate frames as full profile welded.
- C. Interior Frames: Fabricate door and interior borrowed light frames from 16 gauge (0.053 inch, 1.3 mm) cold-rolled steel sheet unless metallic-coated sheet is indicated.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.7 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

- C. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 2. Glazed Lites: Factory cut openings in doors.
 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld full profile, including flush face joints; grind, fill, dress, and make smooth, flush, and invisible.
 2. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 7. Provide 16 gauge grout guard cover box with electric conduit knockouts for each electric hardware component.
- E. Hollow metal doors set in masonry jambs shall be fully grouted. All other exterior doors shall be filled with rock wool insulation.
- F. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- G. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08, Section "Finish Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- H. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow metal work.
 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 VOC LIMIT

- A. Refer to VOC limit tables in Section 018119 for VOC limits for products in this section.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening unless noted otherwise.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are to be filled with grout.
 - h. Backcoating for Hollow Metal Frames: Preparation, installation, and coating thickness shall be in accordance with the written instructions of the manufacturer. Remove any overspray from adjacent surfaces.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of expansion anchors if so indicated and approved on Shop Drawings.
 3. Mineral Wool: Solidly pack mineral-wool batt insulation behind frames and at center mullions at relites. Rigidly attach doubled jamb studs to hollow metal frames allowing only enough room for drywall to be inserted with a tight fit.
 4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.

- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 – FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces, including sliding barn doors, Dutch doors and partial height doors at locations indicated on the Drawings.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.
4. *Solid-core doors with plastic laminate faces (Addendum 3)*

B. Related Sections:

1. Division 01 Section "Sustainable Requirements."
2. Division 07 Section "Finish Hardware" for door hardware.
3. Division 08 Section "Glazing" for glass view panels in flush wood doors.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, and trim for openings. Include factory-finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.

- a. Provide samples for each species of veneer and solid lumber required.

- b. Finish veneer-faced door samples with same materials proposed for factory-finished doors.
 - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.
 - 4. *Plastic Laminate door face material. (Addendum 3)*
- D. Warranty: Sample of special warranty.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets indicating the bonding agents used for each composite wood and agrifiber product used in the project and demonstrating that no added urea formaldehyde resins are used in these products.
- G. A copy of the Chain-of-Custody certificate that was awarded to the wood product manufacturer by the Forest Stewardship Council.
- H. An invoice from the wood supplier that states the supplier's Chain-of-Custody number, the quantity and unit costs of all wood purchased, and the associated Chain-of-Custody certification number for all FSC certified wood.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
 - 1. Provide an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.005 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 LEED REQUIREMENTS

- A. The wood content of all products or assemblies must be sourced from a supplier certified by the Forest Stewardship Council (FSC).
- B. Composite door, solid core doors, interior plywood, millwork, cabinetry, crown molding, counters, wood panel products used on the interior of the building shall contain no added urea-formaldehyde resins.

- C. Adhesives used in field and shop-fabricated assemblies containing these composite wood products shall contain no added urea-formaldehyde resins.

2.2 MANUFACTURERS

- A. Manufacturers: Basis-of-Design, VT Industries, Inc. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved:
 - a. Algoma Hardwoods Inc.
 - b. Ampco Products, Inc.
 - c. Eggers Industries; Architectural Door Division.
 - d. Lynden Door.
 - e. Marshfield Door Systems, Inc.
 - f. Mohawk Flush Doors, Inc.
 - g. Oshkosh Architectural Door Co.
 - h. Pacific Architectural Wood
 - i. Vancouver Door Company, Inc.

2.3 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
- C. Particleboard-Core Doors:
 - 1. Particleboard: ANSI A208.1, Grade LD-1.
 - a. Forest Stewardship Council (FSC) Certified
 - 2. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- D. Structural-Composite-Lumber-Core Doors:
 - 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf.
 - b. Screw Withdrawal, Edge: 400 lbf.

2.4 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
 - 1. Grade: Custom (Grade A faces).

2. Species: White Maple.
3. Finish: Clear (VT CL07)
4. Cut: Plain Sliced.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by a mullion.
6. Assembly of Veneer Leaves on Door Face: Book-matched, center balance match.
7. Room Match: Provide door faces of compatible color and grain within room or area of the building.
8. Exposed Vertical Edges: Applied wood-veneer edges of same species as faces and covering edges of faces.
9. Core: Particleboard or structural composite lumbar.
10. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.
11. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.5 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors:

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer's standard shape.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08, Section "Glazing."

2.7 FACTORY FINISHING

A. General: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated" for factory finishing.

B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.

- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: Manufacturer's standard finish with performance comparable to AWI TR-6 catalyzed polyurethane system.
 - 3. Effect: Semifilled finish.
 - 4. Sheen: Satin.

2.8 PLASTIC LAMINATE FACED DOORS (Addendum 3)

A. Interior Solid Core Doors

- 1. Grade: Premium
- 2. Plastic Laminate Faces: High pressure laminates complying with NEM LD 3, Grade HGS.
- 3. Colors, Patterns, and Finishes: As indicated in drawings, to match wood veneer door faces, or as selected by Architect from laminate manufacturer's full range of products.
- 4. Exposed Vertical and Top Edges: Plastic laminate that matches faces, applied before faces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Finish Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering

unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.

2. Comply with NFPA 80 for fire-rated doors.
3. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
4. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 081520 - INTEGRATED DOOR SYSTEMS

PART 1 - GENERAL

1.1 GENERAL NOTE

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes

- 1. Integrated GRP door systems.

- B. Related Sections:

- 1. Division 08 Section "Finish Hardware" for door hardware not supplied in the Section.

1.3 SYSTEM DESCRIPTION

- A. Integrated GRP door opening assemblies with doors, operating hardware, accessories, and installation for a complete assembly.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, including installation instructions.

- B. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, components, hardware, finish, options, and accessories. Shop Drawings to show required blocking by others.

- 1. Indicate each door and frame condition; frame type, profile and installation detail; items of finish hardware, finishes and electrical rough-in requirements.

- C. Samples: Submit manufacturer's samples of the following sliding door components:

- 1. GRP door panel corner, 6-inch by 6-inch of specified thickness, with two sides exposed to reveal internal construction.
 - 2. Frame section showing interior insulation and finish.

- D. Warranty Documentation: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of integrated GRP doors and frames.

- B. Source: Obtain integrated GRP doors, frames and hardware from single source.

- C. Manufacturer's Qualifications: Manufacturer regularly engaged for past 5 years in manufacture of sliding doors similar to that specified.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
 - 1. Notify manufacturer immediately of any shipping damage.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.
 - 4. Protect materials and finish during storage, handling, and installation to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Quality Standard Product: GRP Hygienic doors as manufactured by DORTEK, One Boston Place, Suite 2600, Boston, MA 02108
Website: <http://www.dortek.com>. Phone: 617-401-8226.
Email: us-sales@dortek.com

2.2 INTERIOR SLIDING GRP INTEGRATED DOORS

- A. Door Description: seamless glass-fiber reinforced polyester molded around non-organic hi-density closed cell core.
 - 1. Quality Standard: Dortek Type K sliding door.
 - 2. Size: As indicated on drawings.
- B. Door and frame Construction:
 - 1. Core: High density closed cell C.F.C. and H.F.C. free core.
 - 2. Facing: Seamless molded polyester, 1 tenth inch (2.5mm) thick.
 - 3. Door thickness: 1-1/2 inch (40mm).
 - 4. Finish: Smooth, non-porous gelcoat with built in color selected from manufacturer's standard palate.
 - 5. Hardware: Stainless steel pull handles
 - 6. Track: Aluminum rail system with nylon bearings.
 - 7. Canopy: Stainless steel with sloping top.
 - 8. Guide: Internal bottom track with nylon guide.
 - 9. Vision Lite Glazing: Acrylic outer panes finished flush with both faces of door. Nominal 12 inch by 24 inch (300mm x 600mm) opening.

- C. Door Operation: Manual

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall openings to receive integrated GRP doors for plumb, level, and square. Note: Finish door operation will be affected by out of tolerance framing.
- B. Verify dimensions of wall openings.
- C. Examine surfaces to receive top and bottom guide.
- D. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

- A. Install integrated GRP doors in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install doors plumb, level, square, and in proper alignment.
- C. Install doors to close against walls without gaps
- D. Install doors to open and close smoothly.
- E. Anchor door tracks securely in place to supports. Required: Fire treated 2 x 6 blocking required full length of track.

3.3 ADJUSTING

- A. Adjust GRP doors for proper operation in accordance with manufacturer's instructions.
- B. Adjust GRP doors to operate smoothly without binding.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

3.4 CLEANING AND PROTECTION

- A. Clean GRP doors and components promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage materials or finish.
- C. Protect installed GRP doors from damage during construction.

END OF SECTION 081520

SECTION 083113 – ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Access doors and frames for walls and ceilings.
 - 2. Refer to Mechanical and Electrical drawings for locations of access doors required to service/maintain equipment and services. Access doors indicated on those drawings are to be provided as work of this Section.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for blocking out openings for access doors and frames in concrete.
 - 2. Division 04 Section "Unit Masonry Assemblies" for blocking out openings for access doors and frames in masonry.

1.3 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, materials, individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.
- D. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation for review by Architect and Engineer.
- E. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Steel Sheet: Uncoated ASTM A 36/A 36M cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- B. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
- C. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Basis of Design Product: The design for the access doors is based on "J.L. Industries," Model No. TM, WB, or FD. Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved.
 - 1. Babcock-Davis.
 - 2. Milcor Inc.
 - 3. Nystrom, Inc.
 - 4. Stiles Custom Metal
- B. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
 - 1. Locations: Wall and ceiling surfaces as shown on plans or as directed by Architect.
 - a. FD Model in rated construction.
 - b. WB Model in Gypsum Board construction.
 - 2. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame.
 - 3. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.

4. Hinges: Continuous piano style.
5. Latch: Cam latch operated by ring turn with interior release.
6. Lock: Mortise cylinder.
7. Size: 24 x 24 inches or as shown on drawings.
8. Allowance: Provide ten (10) non-rated access doors for use in miscellaneous locations in addition to those access doors already shown on the drawings. Size as required to suit conditions, up to 22" x 22".

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
 1. Exposed Flanges: Nominal 1 inch wide around perimeter of frame.
 2. Provide mounting holes in frames for attachment of units to metal or wood framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 1. For cylinder locks, furnish two keys per lock and key all doors alike.
 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install wall access panel with exposed frame surface mounted to face of gypsum wallboard.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 083616.13 – INTERIOR SLIDING DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Sliding Barn Doors – Wood with vision lite, aluminum with glass, aluminum frames and related hardware.

1.2 RELATED SECTION

- A. Division 08 Section “Flush Wood Doors” for wood door panels.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer’s product data, including installation instructions.
- B. Shop Drawings: Submit manufacturer’s shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, components, hardware, finish, options, and accessories. Shop Drawings to show required blocking by others.
- C. Samples: Submit manufacturer’s samples of the following sliding door components:
 - 1. Aluminum Frame finish sample
- D. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.
- E. Warranty Documentation: Submit manufacturer’s standard warranty.
- F. Test Reports: Submit acoustical reports or UL1784 as applicable.

1.4 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of interior aluminum frames and doors.
- B. Source: Obtain sliding aluminum framed doors and hardware from single source.
- C. Manufacturer's Qualifications: Manufacturer regularly engaged for past 5 years in manufacture of sliding doors similar to that specified.

1.5 REFERENCES

- A. ANSI – American National Standards Institute
 - 1. ANSI 156.18 Materials and Finishes
 - 2. ANSI A117.1 Specifications for making buildings and facilities usable by physically handicapped people.

- B. BHMA – Builders Hardware Manufacturers Association
- C. DHI – Door and Hardware Institute
- D. AWS – Architectural Woodwork Standards

1.6 PERFORMANCE

- A. Aluminum perimeter frames with integral acoustic seals
- B. Soft self-closing mechanism integrated with top track
- C. Concealed door guide

1.7 DELIVERY: STORAGE AND PROTECTION

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Notify manufacturer immediately of any shipping damage.
- C. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.
 - 4. Protect materials and finish during storage, handling, and installation to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Quality Standard Product: High performance doors as manufactured by AD SYSTEMS, 2201 100th St. SW, Everett, WA 98204.
Website: <http://specADsystems.com>. Phone: 425-374-1360.
Attn: Estimating: estimating@specADsystems.com

2.2 INTERIOR SLIDING ALUMINUM-FRAMED DOORS AND PARTITIONS

- A. Interior Exam Slide Aluminum-Framed Top-Hung Sliding Doors: Model: AD Systems High Performance Sliding Door System by AD Systems.
- B. Frame Profiles: Extruded aluminum frame “wrap” frame with integral vertical jamb (stile pocket).
 - 1. Finish: Painted Hardcoat (Kynar) Finish meeting AAMA 2604.
 - 2. Color: Standard Light Sequin 789G048.

- C. Door Leafs. All Doors to be factory machined for hardware including pilot and function holes.
 - 1. Reference Division 08 Section "Flush Wood Doors for wood door panels.
 - 2. Aluminum Stile & Rail Door: 3-1/2" stiles plus 1/2" stop.
 - a. Glazing: Monolithic translucent tempered glass.
 - b. Option: 10 inch bottom rail

- D. Door Components:
 - 1. Single Top Track: AD Systems extruded aluminum track by AD Systems
 - 2. Valances: Extruded aluminum with integral end caps
 - a. Sloped valance
 - 3. Top Rollers: tandem nylon roller sized to match door weight
 - 4. Concealed Floor Guide: Integral Jamb floor guide by AD Systems
 - 5. Soft-Closer: Soft and self-closing damper mechanism at [one] or [both] sides of door leaf
 - 6. Handles:
 - a. AD Systems Standard Ladder Pull: 16" long x 1" diameter. Finish: US32D Satin Stainless Steel.

- E. Accessories:
 - 1. Office Door Locks: ADA-5 Key Cylinder & 16-inch Ladder Pull.
 - 2. Privacy Door Locks: Standard ADA-2 Thumbturn with Indicator & 16-inch Ladder Pull]
 - 3. Self-Closing Spring Mechanism.
 - 4. Automatic Door Bottom for improved acoustical performance

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall openings to receive sliding doors for plumb, level, and square. Note: Finish door operation will be affected by out of tolerance framing.
- B. Verify dimensions of wall openings.
- C. Examine surfaces to receive top and bottom guide.
- D. Do not begin installation until unacceptable conditions are corrected.
- E. Base of door side to be flush or minimal. Rubber Base acceptable.

3.2 INSTALLATION

- A. Install sliding doors in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install sliding doors plumb, level, square, and in proper alignment.
- C. Install sliding doors to close against walls without gaps
- D. Install sliding doors to open and close smoothly.
- E. Anchor sliding doors securely in place to supports. Required: Fire treated 2 x 6 blocking required full length of track.

3.3 ADJUSTING

- A. Adjust sliding doors for proper operation in accordance with manufacturer's instructions.
- B. Adjust sliding doors to operate smoothly without binding.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

3.4 CLEANING

- A. Clean sliding doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage materials or finish.

3.5 PROTECTION

- A. Protect installed sliding doors from damage during construction.

END OF SECTION

SECTION 084113 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Swinging Entrance Doors
 - 2. Exterior Storefront Systems. (Thermally Broken).
 - 3. Interior Storefront Systems
- B. Related sections include the following:
 - 1. Division 01 Section “Sustainable Requirements.”
 - 2. Division 07 Section “Joint Sealants” for joint sealants installed as part of aluminum entrance and storefront systems.
 - 3. Division 08 Section “Curtainwall” for interior relite system.
 - 4. Division 08 Section “Aluminum Windows” for exterior windows.
 - 5. Division 08 Section "Finish Hardware" for door hardware for storefront doors.
 - 6. Division 08 Section “Glazing.”
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SYSTEM DESCRIPTION

- A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:
 - 1. Air infiltration and water penetration exceeding specified limits.
 - 2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.
- B. Glazing: Physically and thermally isolate glazing from framing members.
- C. Glazing-to-Glazing Joints: Provide glazing-to-glazing joints that accommodate thermal and mechanical movements of glazing and system, prevent glazing-to-glazing contact, and maintain required edge clearances.
- D. Thermally Broken Construction: Provide systems that isolate aluminum exposed to exterior from aluminum exposed to interior with a material of low thermal conductance.

- E. Wind Loads: Provide entrance and storefront systems, including anchorage, and reinforcing as necessary, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures," whichever are more stringent. See the General Structural Notes for the wind criteria.
1. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4 inch (19 mm), whichever is smaller, unless otherwise indicated.
 2. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.
 - a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
- F. Seismic Loads: Provide storefront systems, including anchorage, capable of withstanding, without failure, the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures," whichever are more stringent. This includes the story drift noted in the General Structural Notes. Refer to the General Structural Notes for seismic design coefficients.
- G. Dead Loads: Provide storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.
- H. Live Loads: Provide storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads without failure of materials or permanent deformation. See Drawings for supporting structural deflection.
- I. Air Infiltration: Provide storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75.2 Pa).
- J. Water Penetration: Provide storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. (299 Pa). Water leakage is defined as follows:
1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

- K. Thermal Movements: Provide storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- L. Structural-Support Movement: Provide storefront systems that accommodate structural movements including, but not limited to, sway and deflection. Refer to General Structural Notes for seismic drift movements.
- M. Dimensional Tolerances: Provide storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

- A. Product Data: For each product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, and details of components, provisions for expansion and contraction, and attachments to other work.
 - 1. Include point-to-point wiring diagrams showing the following:
 - a. Power requirements for each electrically operated door hardware.
 - b. Location and types of switches, signal device, conduit sizes, and number and size of wires.
- C. Samples for Verification: Of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- D. Installer Certificates: If requested, provide signed by manufacturer certifying that installers comply with specified requirements.
- E. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- F. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- G. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

- H. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing storefront systems similar to those required for this Project for a minimum of five years and who is acceptable to manufacturer.
 - 1. Engineering Responsibility: Prepare data for storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Source Limitations: Obtain each type of storefront system through one source from a single manufacturer.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- D. Accessible Entrances: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- F. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.
- G. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."
- H. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating systems without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.
- B. WARRANTY
- C. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- D. Special Warranty: For a 5 year period commencing on the date of Substantial Completion the manufacturer agrees to repair or replace components of storefront systems that fail in materials or workmanship within the listed warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Adhesive sealant failures.
 - c. Cohesive sealant failures.
 - d. Failure of system to meet performance requirements.
 - e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - f. Failure of operating components to function normally.
 - g. Water leakage through fixed glazing and frame areas.
- E. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weather.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.
- B. Basis-of-Design Products: The design for aluminum-framed systems is based on Arcadia system products.
 - 1. Exterior Storefront System: Arcadia System AFG451T thermally broken system to accommodate inch thermal glazing along with various Arcadia accessories as

- shown. Subject to approval by Architect, systems must match basis-of-design frame size and all storefront accessories and components shown and noted on details.
2. Storefront Entrance Doors: Arcadia Heavy Duty Medium Stile, MS362HD Series to accommodate 1 inch thermal glazing.
 3. Interior Storefront Systems: Arcadia AF175 Series, structurally glazed
- C. Products by a manufacturer other than the Basis-of-Design product will be considered only upon prior approval of a pre-bid substitution request made in compliance with Division 01 Section "Product Substitutions and Options." Substitution requests must be accompanied by sufficient detailed documentation to allow the Architect to make a determination that the proposed product provides an equivalent system to the Basis-of-Design product. No post-bid substitutions will be allowed.
1. Alternate Manufacturers:
 - a. Kawneer Company, Inc.
 - b. EFCO

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).
 5. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Steel Reinforcement: Complying with ASTM A 36 (ASTM A 36M) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot-rolled sheet and strip.
- C. Glazing Gaskets: Manufacturer's standard pressure-glazing system of black, resilient glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.
- D. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
- E. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- F. Sealants and joint fillers for joints at perimeter of entrance and storefront systems as specified in Division 07 Section "Joint Sealants."

- G. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.
- H. Aluminum shear block sill anchors.
- I. Aluminum sill extensions per details, color to match storefront.
- J. Aluminum snap covers per details, color to match storefront.

2.3 COMPONENTS

- A. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide nonstaining, nonferrous shims for aligning system components.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Reinforce members as required to retain fastener threads.
 - 2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.
- C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- D. Attachments at Structural Steel: Provide information on spacing and configuration of support clips to be provided on structural steel members for attachment of storefront members where indicated or required.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing, compatible with adjacent materials, and of type recommended by manufacturer.

2.4 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.
- D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

- E. Welding: Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- F. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."
- G. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Storefront: Fabricate framing in profiles indicated for center set, inside glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation. Sub-sills shall have mechanically attached and back sealed end dams.

2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's heavy duty glazed entrance doors for manual-swing operation.
 - 1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.188-inch- (4.8-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - 2. Door Design: Medium stile; 3-1/4-inch nominal width.
 - a. Bottom Rail: Smooth surfaced stile for width of door in area within 10 inches above floor or ground plate.
 - 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.

2.6 ENTRANCE DOOR HARDWARE

- A. General: Provide entrance door hardware and entrance door hardware sets indicated in the hardware schedule for each entrance door to comply with requirements in this Section.
 - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
 - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 - 3. Opening-Force Requirements:

- a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- B. Opening-Force Requirements:
- 1. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.
- C. Weather Stripping: Manufacturer's standard replaceable components.
- D. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- E. Silencers: BHMA A156.16, Grade 1.

2.7 ACCESSORIES

- A. Automatic Door Operators: Division 08 Section "Automatic Door Operators."
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
- 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- C. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- D. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- E. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.8 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF or FEVE resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 07 Section "Joint Sealants."
 1. Use shear block anchors at sill in lieu of fastening through sill frame member.
- E. Coordinate sheet metal flashing and trim installation with details.
- F. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- G. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.
 1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
 2. Remove excess sealant from component surfaces before sealant has cured.
- H. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.
- I. Install perimeter sealant to comply with requirements of Division 07 Section "Joint Sealants," unless otherwise indicated.

- J. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:
1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm). Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.3 ADJUSTING AND CLEANING

- A. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 084113

SECTION 084243 – SLIDING CLEAN ROOM ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes the following type of sliding clean room entrance door systems. Furnish complete aluminum door system, as specified, that has been manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1. Interior, single, sliding aluminum automatic clean room entrance door systems with sidelites, door type 'SCR'.

B. Related Work:

1. Division 07 Section 'Sealants' for perimeter sealants and caulking to the extent not specified in this section.
2. Division 08 Section 'Glazing' for materials and installation requirements of glazing for sliding clean room entrance doors
3. ~~Division 08 Section 'Door Hardware' for hardware to the extent not specified in this section.~~ (Addendum 3)

1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA) 101: Appendix Dissimilar Materials.
- B. American National Standards Institute (ANSI): ANSI A117.1: Accessible and Usable Buildings and Facilities
- C. *ANSI/BHMA A156.10 American National Standard for Power Operated Pedestrian Doors.* (Addendum 3)
- D. American National Standards Institute (ANSI): ANSI Z97.1: Safety Glazing Materials Used in Buildings – Methods of a Test.
- E. American Society for Testing and Materials (ASTM) B221: Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes.
- F. National Fire Protection Association (NFPA) 101: Code for Safety to Life from Fire in Buildings and Structures.
- G. The Aluminum Association (AA) Aluminum Finishes Manual

1.4 PERFORMANCE REQUIREMENTS (Addendum 3)

A. *Compliance with the following:*

1. *ANSI/BHMA A156.10 American National Standard for Power Operated Pedestrian Doors.*

B. *Entrapment Force Requirements:*

1. *Power Operated Sliding Doors: Not more than 30 lbf (133 N) required to prevent stopped door from closing.*
2. *Sliding doors provided with a breakaway device shall require no more than 50 lbf (222N) applied 1 inch (25 mm) from the leading edge of the lock stile for the breakout panel to open.*

C. *Automatic door equipment that has been tested and approved for use in an ISO 3 (Class 1) clean room environment.*

1.5 SUBMITTALS

A. **Product Data:** Submit manufacturer's complete product and installation data sheets including installation details, material descriptions, dimensions of individual components and profiles, fabrication, operational descriptions and finishes.

B. **Shop Drawings:** Submit manufacturer's shop drawings, including elevations, sections and details, indicating dimensions, materials, and fabrication of doors, frames, sidelites, glazing details, hardware, finish, options and accessories.

C. **Samples:** Submit manufacturer's samples of aluminum finish.

D. **Quality Assurance and Closeout Submittals:** Submit the following:

1. **Manufacturer's operation and maintenance data.**
2. **Warranty document as specified herein.**

1.6 QUALITY ASSURANCE

A. **Installer Qualifications:** Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

B. **Manufacturer's Qualifications:** Manufacturer to have minimum (5) five years successful experience in the fabrication of intensive care doors of the type required for this project. Manufacturer capable of providing field service representation during installation, approving acceptable installer and approving application method.

C. **Source Limitations for sliding clean room entrances:** Obtain each type of door, frame, and operator specified in this Section from a single source, same manufacturer unless otherwise indicated

1.7 WARRANTIES

- A. **Manufacturer's Warranty:** Units to be warranted against defect in material and workmanship for a period of one year from the Date of Substantial Completion. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.
- B. **Distributor's Warranty:** 1 year warranty: Labor and transportation charges for defective parts replacement.

1.8 PROJECT CONDITIONS

- A. **Field Measurements:** Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- B. *Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access control system as applicable. (Addendum 3)*

1.9 DELIVERY, STORAGE AND HANDLING

- A. **Ordering and Delivery:** Comply with factor's ordering instructions and lead time requirements. Delivery shall be in factory's original, unopened, undamaged containers with identification labels intact.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide automatic sliding clean room entrance doors by ~~Besam Versamax, a division of~~ ASSA ABLOY Entrance Systems, Model SL 500 *Clean Room. (Addendum 3)*
- B. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Horton Automatics, a division of Overhead Door Corporation
 - 2. DORMA Automatics; Div. of DORMA Group North America.
 - 3. Stanley Access Technologies; Division of The Stanley Works.
- C. **Sliding Clean Room Entrance Door Configuration:**
 - 1. Single sliding, *fixed sidelite (Addendum 3)* clean room type door system.
 - a. **Configuration:** Two equal panel door unit with one operable leave and one sidelite unit.
 - b. *Emergency Breakaway Capability: Sliding leaf only. (Addendum 3)*
 - c. **Mounting:** Overhead header installed between jambs.

2.2 ALUMINUM DOORS AND FRAMES

- A. Doors and Frames: Extruded Aluminum, Alloy 6063-T5.
1. Door panels shall have a minimum .125 inch structural wall thickness including adjoining horizontal members and perimeter frames where applicable.
 2. Door Construction shall be by means of an integrated corner block with 3/8 inch diameter all-thread through bolt from each stile.
 3. Glass Stops shall be .062 inch wall thickness and shall provide security function as a standard by means of a fixed non-removable exterior section with glazing to be performed from the interior only. Glazing stops that allow for glass removal from the exterior shall not be deemed as equivalent.
 - a. *45 degree sloped horizontal glass stops. (Addendum 3)*
 4. ~~Bottom rails shall be provided with a concealed adjustable sweep gasket that is capable of withstanding exposure to 400° F for a minimum of 30 minutes. (Addendum 3)~~
 5. Vertical Stiles shall be narrow stile 2-1/8 inch.
 6. Bottom Rails shall be 4 10 (Addendum 3) inch.
 7. *Gasketing: Slide-in type, replaceable pile non-shedding Santoprene seals retained by the aluminum extrusions. The following types of gasketing are required: complementing gasketing on the joining vertical stiles of the sidelite and sliding door panels, complementing gasketing on the lead edge of the lock stiles of bi-parting doors, gasketing between the carrier and the header, gasketing on the lead edge stile of single slide door panels, gasketing on the pivot stile of breakout sidelite panels, and gasketing on the butt stile of fixed sidelite panels.*
 8. *Clean Room Entrances: Automatic door equipment that has been tested and approved for use in an ISO 3 (Class 1) clean room environment. (Addendum 3)*
- B. Glass: Glazing shall comply with ANSI Z97.1 and UL-1784, (Addendum 3) thickness as indicated.
1. Door Panel and Sidelite Glazing: 1/4" tempered, unless otherwise specified.
 2. Glazing Installation: Dry glazing; wet glazing not allowed.
 3. See Division 8 Section Glazing for requirements.
- C. Door Carriers: Manufacturer's standard carrier assembly that allows vertical adjustment.
1. Carriage Assembly: Carriage bar with two wheel assemblies. Each assembly shall have tandem roller wheels.
 2. ~~Roller Wheels: Two (2) steel roller wheel, 2-3/16 inch diameter, per active door leaf for operation over replaceable extruded nylon 6/6 track. Single journal with sealed oil impregnated bearings. Roller Wheels: Two heavy duty Delrin roller wheels per wheel assembly, for a total of four (4) roller wheels, 1-7/16 inch diameter, per active door leaf for operation over a replaceable aluminum track. Single journal with sealed oil impregnated bearings. (Addendum 3)~~
 3. Two (2) Self-aligning anti-risers per leaf.

- D. Framing Members: Provide clean room entrances as complete assemblies. Manufacturer's standard extruded aluminum framing reinforced as required to support loads.
1. Vertical Jambs shall be 1-3/4 inches by 4-1/2 inches.
- E. Header: Closed design extruded aluminum header unit extending full width of entrance unit to conceal door carrier assemblies, and roller track, complete with hinged access panel for service and adjustment.
1. Size: 4-1/2 inches wide by 4-3/4 7 (*Addendum 3*) inches high.
 2. Hinge Point: Continuous hinge at top of header allows for complete access for adjustments.
 3. Design: Manufacturer's standard closed header.
- F. ~~Anti-Static Option: Fabricate sliding clean room entrances to be internally grounded to reduce static shock. (*Addendum 3*)~~
- G. Hardware: Provide manufacturer's standard hardware as required for operation indicated.
1. ~~Provide optional elbow switch activator. (*Addendum 3*)~~
 2. ~~Flush Bolts: Manual operated flush bolt to secure sidelite panel(s). (*Addendum 3*)~~
 3. *Magnetic catch(s) to retain breakout door and sidelite panels in the closed position. (*Addendum 3*)*
 4. *Locking hardware shall be provided as indicated. (*Addendum 3*)*
 - a. *Electrified slide lock shall automatically lock the sliding function of all sliding door panels within the entrance when the door panels are in the closed position.*
 - 1) *Fail secure operation: Slide lock shall lock the sliding function of the door panels upon loss of power.*
 - 2) *Exterior jamb mounted key switch to unlock sliding door operation.*
- H. Guide Track/Threshold: Manufacturer's threshold as indicated.
1. ~~Trackless Design: Floor mounted guide track and threshold not allowed. Fixed Sidelite Entrance Guide Track: Aluminum guide track integrated in the bottom of the sidelite portion of the sliding automatic door assembly. (*Addendum 3*)~~
- 2.3 DOOR OPERATORS AND CONTROLS (*Addendum 3*)
- A. Door Operator and Controller:
1. *Electro-mechanical controlled unit utilizing a high-efficiency, energy efficient, DC motor requiring a maximum of 3 amp current draw, allowing 5 operators on one 20 amp circuit. The supplied system shall have the capability to operate at*

full performance well beyond a brown out and high line voltage conditions (85V – 265V) sensing changes and adjusting automatically. The operator shall allow an adjustable hold open time delay of 0 to 60 seconds and have internal software to incorporate a self-diagnostic system.

B. Microprocessor Control Box:

1. Modular control unit to allow for changing technology. Factory-adjusted configuration with opening and closing speeds set to comply with ANSI/BHMA A156.10 requirements and electronic dampening to reduce wear on drive train. Should the drive train operations deviate from design criteria ranges, Watchdog Control Circuit Monitoring will assume command of the system and shut down the automatic function allowing a secondary supervisory circuit to perform as a backup. Control unit shall allow the following functions:

a. Diagnostics with the ability to produce application data.

2. Mode Selector Control:

a. Multi-position keyed cylinder mode selector control shall allow selection of the indicated functions to be engaged when switch is turned to the appropriate setting.

b. Mode Selector Control Mounting: Control shall be jamb mounted.

c. Mode selector control to allow the following functions:

1) “Off”

2) “Exit Only” one way traffic with automatic operation from the interior.

3) “Two Way Traffic” allowing automatic operation from exterior and interior.

4) “Partial Opening” energy saving door position allows door to automatically adjust opening width based on amount of usage, that is, full open during high use and partial open during low use. The control for this setting is programmable allowing adjustment to both the usage setting and the opening width.

5) “Hold Open” doors activated and held in the full open position.

2.4 ACTIVATION AND SAFETY CONTROL DEVICES (Addendum 3)

A. General: Provide the types of activation and safety devices specified in accordance with ANSI/BHMA standards, for the condition of exposure and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.

B. Safety Presence Sensor:

1. Shall be a sliding door sensor utilizing K-band microwave technology to detect motion and focused active infrared technology to detect presence, combined in a single housing surface mounted on each side of the header.

- a. *Presence sensor shall remain active at all times.*
 - b. *The sensor shall communicate with the automatic door operator through a self-monitoring connection that allows the door to go into a fail-safe mode preventing the door from closing in the event of a sensor failure.*
 2. *Motion/presence detecting sensors to be field installed and adjusted.*
- C. *Knowing Act Activation Device:*
 1. *Touchless Sensor Switch: Stainless steel 4-1/2 inch x 4-1/2 inch faceplate, wall mounted, black hand icon graphics, hard wired. Infra-red microburst sensing technology with an adjustable operating range of 1 inch to 28 inches.*
 - a. *Light ring to provide red-blue-green visual indication of door status.*
 - b. *See "Door Interlock System" for operation.*
 - c. *Touchless Sensor Switch: "CM-331/WS-SGLR" by Camden Door Controls (2 required per sliding entrance).*

2.5 DOOR INTERLOCK SYSTEM (Addendum 3)

- A. *Locking Hardware: Electrified slide locks shall be connected to the door interlock control system as indicated to allow operation of only one entrance within the interlock circuit at any given time.*
- B. *Door Interlock System: Provide an interlock system to interlock three (3) sliding entrances "Door #232," "Door #233" and "Door #234".*
 1. *Sequence of operation: The interlock system shall prevent the opening of another interlocked entrance when one of the interlocked doors in the circuit is in the open position.*
 - a. *The interlock system shall allow operation of a door after all interlocked doors in the circuit are returned to the closed and locked position.*
 - b. *The resettable emergency push switch shall provide emergency release of an interlocked entrance.*
 2. *Door Interlock Components: Provide all components required for a complete operable system including the following:*
 - a. *Door interlock controller: "ES550" by Electronic Solutions.*
 - b. *Door position switches: "DPS" by Securitron (1 required per opening).*
 - c. *Resettable emergency push switch:*
 - 1) *"CM-4085B" with pneumatic timer by Camden Door Controls (1 required per opening unless indicated otherwise).*
 - 2) *"CM-5085PTER" with pneumatic timer by Camden Door Controls (1 required per opening unless indicated otherwise; mounted egress side).*
 - d. *Power supply: "BPS-24" by Securitron.*

- e. *Activation Device with red-blue-green visual indication: See "Activation and Safety Control Devices."*
 - 1) *Red Visual Indicator: A door in the interlock system is in the open position. Activation is not available.*
 - 2) *Green Visual Indicator: All doors in the interlock system are in the closed position. Activation is available.*

2.6 ELECTRICAL (Addendum 3)

- A. *High-Efficiency DC Motor: Maximum of 3 amp current draw, allowing 5 operators to run on one 20 Amp circuit.*
- B. *Power: Self-detecting line voltage capable control. 120 VAC through 240 VAC, 50/60 Hz, 3 amp minimum incoming power with solid earth ground connection for each door system.*
- C. *Key Impulse Input: Input for card readers or remote activation with independent adjustable hold open delay.*
- D. *Wiring: Separate internal channel raceway free from moving parts.*
- E. *Brown out / high voltage capability: System has capability to operate at full performance well beyond brown out and high voltage line conditions (85 V – 265 V) sensing changes and adjusting automatically.*
- F. *Convenience Battery: Shall be concealed in header and capable of full operation with blackout conditions, including sensor capabilities for minimum of 100 cycles.*

2.7 ALUMINUM FINISHES

- A. *Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.*
 - 1. *Structural Header Sections: Minimum 3/16" thickness.*
 - 2. *Structural Frame Sections: Minimum 1/8" thickness.*
 - 3. *Structural Panel Sections: Commercial grade.*
- B. *Anodized Finish (for all exposed aluminum surfaces):*
 - 1. *AAMA 611, Clear, AA- M12C22A41, Class I, 0.018 mm.*
- C. *MicroShield™ antimicrobial silver-based ion, baked-on enamel finish on door pulls.*
 - 1. *Antimicrobial finish must permanently suppress the growth of bacteria, algae, fungus, mold and mildew by the controlled release of silver ions that attack microbes and inhibit the growth on the treated surfaces.*
 - 2. *Coating to be EPA registered resulting in a safe and non-toxic finish; chlorinated or synthetic chemical finishes will not be accepted.*

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Installer must verify that base conditions previously installed under other sections are acceptable for product installation according to manufacturer's instructions. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not start work until all negative conditions are corrected in a manner acceptable to the installer and manufacturer.
- B. *Examine roughing-in for electrical source power to verify actual locations of wiring connections. (Addendum 3)*

3.2 INSTALLATION

- A. General: Install door units plumb, level and true to line, without warp or rack of frames or sash with manufacturer's prescribed tolerances. Provide support and anchor in place.
 - 1. Install surface mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets and guides level and true to location with anchorage for permanent support.
- B. Dissimilar Materials: Comply with AAMA 101, Appendix Dissimilar Materials by separating aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.
- C. *Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections. (Addendum 3)*
- D. Glazing: Glaze clean room entrance door panels in accordance with the Glass Association of North America (GANA) Glazing Manual, published recommendations of glass product manufacturer, and published instructions of sliding clean room entrances manufacturer.
- E. Sealants: Comply with requirements specified in division 7 Section "Joint Sealants" to provide weather tight installation.
 - 1. Set thresholds and framing members in full bed of sealant.
 - 2. Seal perimeter of framing members with sealant.
- F. *Signage: Apply signage on both sides of each door and sidelite as required by ANSI/BHMA A156.10 and manufacturers installation instructions. (Addendum 3)*

3.3 FIELD QUALITY CONTROL

- A. Manufacturers Field Services:
 - 1. Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

2. *Before placing doors into operation, AAADM certified technician shall inspect and approve doors for compliance with ANSI/BHMA A156.10. Certified technician shall be approved by the manufacturer. (Addendum 3)*

3.4 ADJUSTING

- A. Adjust doors and hardware for smooth, safe operation. *Adjust doors in compliance with ANSI/BHMA A156.10. (Addendum 3)*

3.5 CLEANING, ADJUSTMENT AND PROTECTION

- A. Cleaning: After installation, installer to take the following steps:
 1. Remove temporary coverings and protection of adjacent work areas.
 2. Remove construction debris from construction site and legally dispose of debris.
 3. Repair or replace damaged installed products.
 4. Clean product surfaces and lubricate operating equipment for optimum condition and safety.
 5. Comply with requirements in Division 08 Section Glazing for cleaning and maintaining glass
- B. Protection: Contractor shall provide adequate protection for door installation through the remainder of the construction period, to ensure that doors will be without damage or deterioration (other than normal weathering) at the time of substantial completion.

3.6 DEMONSTRATION

- A. *Engage a factory-authorized representative to train Owner's maintenance personnel to adjust, operate, and maintain safe operation of the door. (Addendum 3)*

END OF SECTION 084243

SECTION 084413 – GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Conventionally glazed aluminum curtain walls. (Thermally broken).
 - 2. Fixed custom sunshades.
- B. Related sections include the following:
 - 1. Division 07 Section “Joint Sealants” for joint sealants installed as part of aluminum curtainwall systems.
 - 2. Division 08 Section :Aluminum Framed Entrances and Storefronts” for interior and exterior storefront and entry doors.
 - 3. Division 08 Section “Glazing.”
- C. The work in this Section shall be provided by the same manufacturer and installer as the following Sections:
 - 1. Division 08 Section “Aluminum Framed Entrances and Storefronts”.
- D. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide heavy-duty aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
 - 1. Structural loads.
 - 2. Thermal movements.
 - 3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
 - 4. Dimensional tolerances of building frame and other adjacent construction.
 - 5. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferred to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - d. Noise or vibration created by wind and thermal and structural movements.

- e. Loosening or weakening of fasteners, attachments, and other components.
 - f. Sealant failure.
 - g. Failure of operating units to function properly.
- B. Delegated Design: Design glazed aluminum curtainwall systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Loads:
1. Wind Loads: As indicated in Structural notes.
 2. Seismic Loads and Seismic Drift: As indicated in Structural notes.
- D. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity but not less than 10 seconds.
- E. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.
- F. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- G. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.
- H. Thermal Performance: Window submittals shall include – Certified NFRC Product Data for the u-value, solar heat gain coefficient (SHGC) and air leakage (AL).
- 1.4 SUBMITTALS
- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from 12-inch lengths of full-size components and showing details of the following:
 1. Joinery.
 2. Anchorage.
 3. Expansion provisions.
 4. Glazing.
 5. Flashing and drainage.
- E. Welding certificates.
- F. Qualification Data: For Installer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems.
- H. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
- I. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
 1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies. Engineer is to be currently licensed in the State of Washington.
- B. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)" and the State of Washington Amendments.
- C. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals and metal finishes, and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through operable and fixed glazing and framing areas.
 - f. Failure of operating components to function properly, including windows.
 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed curtainwall system, including framing and accessories, from single manufacturer.
- B. Basis-of-Design Curtainwall Product: The design for glazed aluminum curtain-wall systems is based on Arcadia System T500-OPG6000.
- C. Basis-of-Design Sunshade Product: The design for fixed sunshades is based on Arcadia Standard Vertical Brise Soleil BSD012 with ¾" x 6" Rectangular Tube (CT7560). Reference drawings for location and configuration.
- D. Products by a manufacturer other than the Basis-of-Design product will be considered only upon prior approval of a pre-bid substitution request made in compliance with Division 01 Section "Product Substitutions and Options." Substitution requests must be accompanied by sufficient detailed documentation to allow the Architect to make a determination that the proposed product provides an equivalent system to the Basis-of-Design product. No post-bid substitutions will be allowed.
 1. Alternate manufacturers:
 - a. Kawneer North America, an Alcoa Company.
 - b. EFCO

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Sunshade Extrusion Blades and Aluminum Plate: ASTM B211, Alloy 6063-T6
- B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 611.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
- D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
 - 1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - 2. Reinforce members as required to receive fastener threads.
- E. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- F. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing compatible with adjacent materials.
- G. Framing Gaskets: As recommended by manufacturer for joint type.
- H. Framing Sealants: Sealant and joint fillers for joints within glazed aluminum curtain wall system as specified in Division 7 Section "Joint Sealants."
- I. Glazing Systems:
 - 1. Glazing: As specified in Division 08 Section "Glazing."
 - 2. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
 - 3. Glazing Sealants: As recommended by manufacturer for joint type.
- J. Accessory Materials:

1. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.
2. Aluminum Snap Covers: Per details on drawings. Color to match curtain wall.
3. Compression Seal Joint: Iso-Flex Compression Seal Joint System C23 Black, with Iso-flex Lube Adhesive, by LymTal International, Inc. Or equal. See details for locations.

2.3 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.
- D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- E. Welding: Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- F. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."
- G. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Sunshades: All fascia and blades to be 6063-T6 aluminum-extruded members. Outrigger components shall be 6061-T6 aluminum plates.
 1. Manufacturer shall allow +/- 1/8" thermal expansion room at each shade to compensate for dissimilar movement between building structure and aluminum sunshade structure. This design shall be incorporated as to not induce self-destructing loads onto either shade or building veneer.
 2. No blade fasteners shall be visible after installation of sections. Provide cover plates at each outrigger end to conceal fasteners. Only mounting hardware shall be visible after installation
 3. Components to be shop assembled in large practical sections to allow for immediate installation. Sections indicated on shop drawings to be assembled and shipped as units with cover plates and support arms, if required, shipped loose.

2.4 VOC LIMIT

- A. Refer to VOC limit tables in Section 018119 for VOC limits for products in this section.

2.4 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF or FEVE resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing curtainwall systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight. Comply with manufacturer's written instructions.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 07, Section "Joint Sealants" and to produce weathertight installation.
 - 1. Use shear block anchors at sill in lieu of fastening through sill frame member.
- E. Install components plumb and true in alignment with established lines and grades, without warp or rack.
- F. Install glazing as specified in Division 08, Section "Glazing."
 - 1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
 - 2. Remove excess sealant from component surfaces before sealant has cured.

- G. Install perimeter joint sealants as specified in Division 07, Section "Joint Sealants" and to produce weathertight installation.
- H. Anchor sunshades to building substructure. Maintain manufacturer's recommended tolerances for clips, mounting brackets and shade sections. Set units level, plumb and true to line with uniform joints. Erect sunshades after all adjacent painting, masonry (including chemical treatments), roofing, electrical, glazing, and other similar work is completed above and below the sunshade sections.
- I. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
 - 1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
 - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm). Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
 - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

END OF SECTION 084413

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes operable and fixed aluminum-framed windows.
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 08 Section "Aluminum Framed Entrances, Storefronts, and Curtainwall" for windows and sunscreens in fenestration systems.
 - 3. Division 08 Section "Sound Control Windows" for special acoustical windows.
 - 4. Division 08 Section "Glazing" for glass and insulated glazing units.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
 - 1. Design pressure number in pounds force per square foot (pascals) used to determine the structural test pressure and water test pressure.
- B. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- C. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified.
 - 1. Size indicated on Drawings.
- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural Test:

1. Design Wind Loads: As indicated in Structural Notes in Structural Drawings.
 - a. Alternatively, wind loads may be calculated in accordance with ASCE 7-10 Chapter 30 using criteria from general structural notes.
2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations.

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
 1. Mullion details, including reinforcement and stiffeners.
 2. Joinery details.
 3. Expansion provisions.
 4. Flashing and drainage details.
 5. Weather-stripping details.
 6. Thermal-break details.
 7. Glazing details.
- C. Samples for Verification: For aluminum windows and components required, prepared on Samples of size indicated below.
 1. Window Corner Fabrication: 12-by-12-inch long, full-size window corner including full-size sections of extrusions with factory-applied color finish, weather stripping, and glazing.
- D. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, class, grade, and size of aluminum window. Test results based on use of downsized test units will not be accepted.
- G. Maintenance Data: For operable window sash, operating hardware and finishes to include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

1.6 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
 - 1. Installer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of data for aluminum windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01, section "Product Substitutions and Options; Substitution Request Form." Do not modify size and dimensional requirements.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- F. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials,

components, accessories, and fabrication. Comply with more stringent requirements if indicated.

1. Provide AAMA certified aluminum windows with an attached label.

G. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Failure to meet performance requirements.
- b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
- c. Faulty operation of movable sash and hardware.
- d. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
- e. Failure of insulating glass.

2. Warranty Period:

- a. Window: Two years from date of Substantial Completion.
- b. Metal Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Arcadia
2. Kawneer North America, an Alcoa Company

3. EFCO

- B. Quality Standard Product: Arcadia T200 Series.

2.2 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength, not less than 16,000-psi minimum yield strength, and not less than 0.125-inch thickness at any location for the main frame and sash members.
- B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
1. Reinforcement: Where fasteners screw anchor into aluminum less than 0.125 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
 2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
- C. Anchors, Clips, Brake Shapes, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- D. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when aluminum window is closed.
1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA 101/I.S.2/NAFS.
- E. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 WINDOW

- A. Window Type: Projected and Fixed, see drawings for locations.
1. Arcadia T200 Series thermal heavy commercial fixed and awning windows, 2-inch depth.
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA 101/I.S.2/NAFS.
1. Performance Class and Grade: AW-PG95-P & AW-PG135-FW.

- C. Thermal Transmittance: Provide aluminum windows with a whole-window, U-factor maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to NFRC 100.

- 1. U-Factor: 0.43 Btu/sq. ft. x h x deg F or less.

2.4 GLAZING

- A. Glass and Glazing Materials: Refer to Division 08, Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.

2.5 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907 or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals. Where exposed, provide *clear anodic satin aluminum finish. (Addendum No. 2)*

- B. Cam Lock and Four-Bar Friction Hinges (Bronze Alloy): Comply with AAMA 904.

- C. Limit Devices: Provide limit devices designed to restrict sash or ventilator opening.

- 1. Safety Devices: Limit clear opening to 4 inches for ventilation; with custodial key release.

- D. Projected Awning Windows: Provide the following operating hardware:

- 1. Lock: Lift-type throw, cam-action lock with keeper; two per ventilator.

2.6 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

- B. All windows shall be capable of receiving up to 1 inch glass assemblies.

- C. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

- D. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

- E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.

- F. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- G. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08, Section "Glazing" and with AAMA/WDMA 101/I.S.2/NAFS.
- H. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08, Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: Kynar black matte (no gloss.)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and ventilators, screens, hardware, operators, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain window operating system. Refer to Division 01, Section "Operations and Maintenance Data" for Owner training requirements.

3.5 FIELD QUALITY CONTROL

- A. Installed products to be cleaned and adjusted for proper operation immediately prior to testing.
- B. Window installation to be tested by qualified independent testing agency for water penetration resistance.
- C. Window manufacturer is to be present during testing.
- D. Test installed windows for compliance with performance requirements for water penetration in accordance with ASTM E 1105 cyclic pressure and as follows:
 - 1. Cyclical pressure testing to be performed to FOUR cycles of 5 minutes each as described in referenced standard.
 - 2. Window system: 8.00 psf
 - 3. Number of Tests: Minimum of three (3) of each type of storefront and entrance or as required to achieve compliance with manufacturer's published performance ratings.
 - a. First Test: Take at initial installation.
 - b. Second Test: Take at 50% completion.
 - c. Third Test: Take at 80% completion.
 - d. If any windows fails, test additional windows at Contractor's expense.
- E. On-site tests for water infiltration will be performed as described herein.
 - 1. Correct deficiencies in units, which fail to meet specified requirements, and units having similar deficiencies. Defective units to be retested.
 - 2. Test windows, including perimeter joint and interface with adjacent building construction.
- F. Field QA/QC Testing:
 - 1. Testing to be conducted on interior seals, typically window to wall interface.
 - 2. Test randomly selected window units during installation process in general accordance with ASTM E 1105.
 - a. Test location and volume to be determined at discretion of Architect.

END OF SECTION 085113

SECTION 085653 - SECURITY WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sliding, transaction security windows.

1.3 COORDINATION

- A. Coordinate installation of anchorages for security windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, weights and finishes for window units.
- B. Shop Drawings: For security windows.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
 - 3. Hardware for sliding window units.
 - 4. Glazing details.
 - 5. Details of transaction counter.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Framing: 12-inch- long sections of frame members.
- D. Cutaway Sample: Corner of security window, made from 12-inch lengths of full-size components, and showing details of the following:
 - 1. Joinery.
 - 2. Anchorage.
 - 3. Glazing.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of security window and accessory indicated as ballistics or forced-entry resistant, for tests performed by a qualified testing agency.
- B. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 2. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Pack security windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.
- B. Label security window packaging with drawing designation.
- C. Store crated security windows on raised blocks to prevent moisture damage.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace security windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including deflections exceeding 1/4 inch.
 - b. Failure of welds.
 - c. Faulty operation of sliding window hardware.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Attack Resistance: Provide units identical to those tested for compliance with requirements indicated, and as follows:
 - 1. Ballistics Resistance: Level 1 when tested according to UL 752.

2.2 SLIDING, TRANSACTION SECURITY WINDOWS

- A. Provide sliding, transaction security windows.
 - 1. Quality Standard Product: InterbankX Model ATX-T4-4836
- B. Configuration: One fixed-glazed panel and one horizontal-sliding glazed panel.
- C. Operation: Manual open/self-closing.
- D. Framing: Fabricate perimeter framing, mullions, and glazing stops from aluminum as follows:
 - 1. Profile: Manufacturer's standard, with minimum face dimension indicated.
 - a. Minimum Face Dimension: 1-1/2 inches.
 - 2. Depth: 5 inches
- E. Head and Jamb Framing: Designed for sealant glazing. Removable header access panel on secure side.
- F. Sill: High pressure laminated plastic shelf 12 inches deep by width of security window, with integral stainless steel deal tray.
- G. Sliding Window Hardware: Provide roller track designed for overhead support of manufacturer's standard carrier supporting horizontal-sliding glazed panel with manufacturer's standard self-closing mechanism mounted in header]. Provide manufacturer's standard pull and lock with two keys for each horizontal-sliding glazed panel.
- H. Glazing and Glazing Materials: Bullet Resistant Polycarbonate.
 - 1. Glazing Meeting Edges: Polished glazing.
- I. Materials:
 - 1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
 - 2. Aluminum Extrusions: ASTM B 221. Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength.
 - 3. Aluminum Sheet and Plate: ASTM B 209.

2.3 FABRICATION

- A. General: Fabricate security windows to provide a complete system for assembly of components and anchorage of window units.

1. Provide units that are reglazable from the secure side without dismantling the attack side of framing.
- B. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.
 1. Fabricate framing with manufacturer's standard, internal opaque armoring in thicknesses required for security windows to comply with ballistics-resistance performance indicated.
- C. Glazing Stops: Finish glazing stops to match security window framing.
 1. Attack-Side (Exterior) Glazing Stops: Welded or integral to framing.
 2. Secure-Side (Interior) Glazing Stops: Removable, coordinated with glazing indicated.
- D. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- E. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 1. Color: Black.

2.6 ACCESSORIES

- A. Recessed Deal Trays: Formed from stainless steel fabricated in curved shape with exposed flanges for recessed installation into horizontal surface.
 1. Clear Opening Size: 12 inches wide by 8 inches deep by 1-1/2 inches high.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of security windows.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.
- C. For factory-installed glazing materials whose orientation (secure or attack side) is critical for performance, verify installation orientation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing security windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
 - 1. Install an attached or integral flange to secure side of security windows extending over rough-in opening gap so that gap has same ballistics-resistance performance as security window.
- B. Glazed Framing: Provide gasket-glazed framing. Comply with installation requirements in Section 088853 "Security Glazing."
- C. Removable Glazing Stops and Trim: Fasten components with security fasteners.
- D. Fasteners: Install security windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials.
- E. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose.

3.3 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

3.4 ADJUSTING

- A. Adjust horizontal-sliding, transom security windows to provide a tight fit at contact points for smooth operation and a secure enclosure.

- B. Remove and replace defective work, including security windows that are warped, bowed, or otherwise unacceptable.

3.5 CLEANING AND PROTECTION

- A. Clean surfaces promptly after installation of security windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
 - 1. Lubricate sliding security window hardware.
- B. Clean glass of preglazed security windows promptly after installation.
- C. Provide temporary protection to ensure that security windows are without damage at time of Substantial Completion.

3.6 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain operable security windows.

END OF SECTION 085653

SECTION 086200 - UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes dome unit skylights with formed curb counterflashing with integral prefabricated roof curbs.
- B. Related Sections include the following:
 - 1. Division 07 roofing section for flashing and roofing terminations at unit skylight curbs.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide unit skylights, including anchorage, capable of withstanding, without failure, the effects of the following:
 - 1. Structural loads.
 - 2. Thermal movements.
 - 3. Movements of supporting structure.
 - 4. Dimensional tolerances of building frame and other adjacent construction.
- B. Structural Loads:
 - 1. Wind Loads: As indicated by structural design data on Drawings.
 - 2. Snow Loads: As indicated by structural design data on Drawings.
 - 3. Concentrated Live Loads: 250 lbf applied to framing members at locations that will produce greatest stress or deflection.
 - 4. Seismic Loads: As indicated by earthquake design data on Drawings.
 - 5. Load Combinations: Calculate according to requirements of applicable code indicated on Drawings.
 - 6. Opening Protection: Design and engineer skylights to provide opening protection and fall restraint in compliance with Washington OSHA without the use of guardrails or screens.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Unit Skylight Standard, Dynamic Dome model CE-4 certified to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS-11 or previous) as follows:
 - 1. Performance Grade (Primary Designator): SKP-PG30 1670 x 2885 (66 x102)

2. Design Pressure (DP): Minimum DP = +/- 30 psf (+/- 14.40 KPa). Dome shall not invert at positive design pressure.
 3. Water Test Pressure: Minimum 4.6 psf (220 Pa) with no leakage at 5 gallons per minute spray rate.
 4. Air Leakage Rate: Maximum 0.05 cfm/ft² (0.3 L/s/m²)
- E. Daylighting: Provide daylighting photometric performance comparable to basis of design product at layout indicated, based upon daylighting profile of March 21, 9:00 am local time, at Project location by simulation in accordance with IESNA guidelines.
- F. Air Infiltration: Maximum air leakage through tested size of 0.05 cfm/sq. ft. (0.3 L/s/sq. m) of fixed area as determined according to ASTM E 283 at a static-air-pressure differential of 1.57 lbf/sq. ft. (75Pa.)
- G. Water Penetration under Static Pressure: No evidence of water penetration through unit when tested according to ASTM E 331 at a static-air-pressure differential of 4.6 lbf/sq. ft. (220 Pa).
- H. Fire Testing for Roof Assemblies with Fire Classifications: Unit skylight tested in accordance with and listed as passing Class B Burning Brand test as described in ASTM E 108.
- I. Dome Burn Rate: Tested in accordance with ASTM D 635 with a documented rating of CC1.
- J. Dome Smoke Density Rating: Testing in accordance with ASTM D 2843 with a documented performance value less than or equal to 75.
- K. Dome Self-Ignition Temperature: Tested in accordance with ASTM D 1929 with a documented performance value greater than or equal to 650 degrees Fahrenheit.
- L. Dome Hail Resistance: Exterior dome tested in accordance with Factory Mutual 4430 to meet severe hail with 2.0 inch ice balls.
- M. Energy Performance ratings for any size commercial curb mounted unit skylight with dynamic dome as follows:
1. Thermal Transmittance: NFRC 100 maximum U-factor:
 - a. Double Dome: IR Block Smooth Acrylic (3I2W2): 0.44
 2. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC:
 - a. Double Dome: IR Block Smooth Acrylic (3I2W2): 0.30

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal-framed skylights.
- B. Shop Drawings: For unit skylights. Include plans, elevations, sections, details, and attachments to other work.

1. Include structural analysis data signed and sealed by the qualified professional engineer registered in the State of Washington responsible for their preparation.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each framing intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
 1. Joinery.
 2. Anchorage.
 3. Expansion provisions.
 4. Glazing – glass is not required to match the specified glazing
 5. Flashing and drainage.
 6. Building skylight Thermal break design
- F. Field quality-control test and inspection reports.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for unit skylights.
- H. Preconstruction Test Reports: For unit skylight assemblies.
- I. Maintenance Data: For unit skylights to include in maintenance manuals.
- J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Entity capable of assuming engineering responsibility and performing work, of this Section, with a minimum of three (3) years' experience installing work of similar magnitude and complexity, and who is acceptable to manufacturer.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for skylights' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including testing conducted by an independent testing agency and in-service performance.
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Final As Approved Record Shop Drawings after obtaining them in the field

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, dome, and other materials beyond normal weathering
 - b. Breakage of polycarbonate glazing.
 - c. Water leakage.
- 2. Warranty Period:
 - a. 15 years from date of Substantial Completion for polycarbonate dome for hail breakage from hail stones 2 inches diameter and less. Mill finished aluminum skylight frames.
 - b. 10 years: yellowing of acrylic and polycarbonate skylight domes.
 - c. 5 years: Acrylic and impact modified acrylic dome skylights, model CDS with polycarbonate dome, aluminum curbs, external safety cage, internal safety screen accessory, internal security bars accessory, ventilation curb extension.
 - d. 1 year: steel curbs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for metal-framed unit skylights is based on Velux America LLC, Dynamic Dome skylight model CE4. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Wasco Skylights
 - 2. Bristolite Skylights

2.2 SYSTEM DESCRIPTION

- A. Dome with integral insulated aluminum curb, fixed skylight utilizing extruded aluminum frame counter-flashing with welded corners, an interior 100% thermally broken gasket for condensation drainage, structural sealant, and accessories, as required to meet installation and performance requirements indicated. Dynamic dome skylights shall be suitable for installation on roof curbs ranging from 0 degrees up to 60 degrees from horizontal.
 - 1. Basis of Design: VELUX America LLC, Model CE4-6072-3I2W2 Dynamic Dome Skylight.

- B. Dome: Height 30% of skylight width, vacuum formed with precise repeating geometric patterns, and overall shape to maximize strength and daylight at low solar elevation angles 10 to 40 degrees. Outer dome shall be formed from smooth sheet and not prismatic in order to transmit all incident daylight through outer dome. Initial rise of the dome shall be at an angle of at least 60 degrees to horizontal in order to harvest daylight at low solar elevation angles 10 through 40 degrees. Provide polycarbonate domes with integral UV blocking cap layer that prevents long-term yellowing, and insures material strength and performance stability. Light diffusion 100%.
1. Energy Dome: Outer dome clear 0.118 Dynamic IR Block Smooth Acrylic / 16 mm White Multiwall Polycarbonate.
- C. Aluminum Frame Counter-flashing: Maintenance-free, extruded aluminum, grade 6063-T5, 0.06 inch (1.5 mm) thick with neutral grey powder coat finish. Counter-flashing frames completely welded in corners and counter flashes curb a minimum of 1.625 inches (41 mm). Provide aluminum frame with at least 0.75 inch (19 mm) continuous ledge on each side of the skylight that is a pinch free access for stacking, manual transportation and mounting of skylights.
1. Unit Size: 60 inches by 72 inches
- D. 100% Thermally Broken Gasket for Condensation Drainage: Factory applied black thermoplastic gasket encapsulating the entire interior aluminum frame assembly providing a thermal break weather seal and drainage for condensation. The gasket design shall allow positive condensation to the exterior of the curb without exposed drainage openings in the aluminum frame that can introduce air infiltration into the skylight. The thermally broken gasket construction shall allow for a dry installation of skylight to the curb, eliminating weather seal strips or caulking at the top of the curb.
- E. Structural Sealant: Factory applied silicone sealant, gray color, bonding the dome to the aluminum frame and suitable for external exposure.

2.3 CURBS

- A. Aluminum Curb: Factory insulated aluminum curb, 1.5 inches in thickness with 20-gauge mill finished aluminum exterior and 22-gauge mill finished aluminum interior. Curb factory insulated with 1.5 inches of polyisocyanurate board providing an R-value of 8.5. Width and length of curb shall be 6072 with 16-inch curb height. Curb roof mounting flange shall be a minimum 2.75 inches in width.
1. Basis of Design: VELUX America LLC, Model CCAM. Skylight shall be attached to curb prior to shipping.

2.4 MATERIALS

- A. Joint Sealants: As specified in Division 7 Section "Joint Sealants."
- B. Mastic Sealants: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install unit skylights in accordance with manufacturer's written instructions and approved shop drawings. Coordinate installation of units with installation of substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that finished installation is weather tight. Comply with manufacturer's written instructions.
- B. Where metal surfaces of unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.
- C. For custom flashings, install unit skylight curb counter-flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.
- D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight to exterior.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test and inspection reports.
- B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed skylights with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, skylights shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- C. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 CLEANING AND PROTECTION

- A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Replace glazing that has been damaged during construction period.
- C. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION 086200

SECTION ~~083613~~ 086613 - SECTIONAL OVERHEAD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following types of sectional overhead doors.
 - 1. Electrically operated motorized sectional overhead service doors.
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 05 Section "Metal Fabrications" for door opening jamb and head support members.
 - 3. Division 08 Section "Access Doors and Frames" for access doors.
 - 4. Division 08 Section "Finish Hardware" for cylinder core to match building system.
 - 5. Division 11 "Loading Dock Accessories" for dock bumpers, seals, overhead door track protector, and interior bollards.
 - 6. Division 26 "Electrical" for wiring and conduit, fuses, disconnect switches, connection of operator to power supply, and installation of control station and wiring.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.
- D. Provide complete operating door assemblies including door curtains, guides, counterbalance mechanisms, hardware, and installation accessories.
- E. Electrical Subcontractor to furnish the following for power operated units: Line fuses and main line disconnect. All wire, conduit and boxes for the aforesaid items and also for the motor operator, key operated control station, limit switches and accessory items, i.e. Automatic Reversing Control, and/or any other as may be specified.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of overhead door. Include manufacturer's operating instructions and maintenance data.
- B. Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed in manufacturer's data. Indicate opening dimensions

and required tolerances, jamb connection details, anchorage spacing, hardware locations, installation details, and special conditions.

- C. Samples for Initial Selection: Provide manufacturer's finish charts showing full range of colors and textures available for units with factory applied finishes.
 - 1. Include similar samples of accessories involving color selection.
- D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- E. Provide O&M documentation for sectional overhead doors per Division 01 Section "Submittal Procedures" and Division 01 Section "Operations and Maintenance Data."

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide sectional overhead doors from a company specializing in the manufacturing of products specified in this section and with a minimum of five years' experience
- B. Installer Qualifications: Installer shall be authorized and qualified to install overhead door systems on the type and scope of project specified.
- C. Provide each sectional overhead door as a complete unit produced by one manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, hardware, operators and installation accessories, to suit the openings and head room allowable.
- D. Unless otherwise acceptable to Architect, furnish sectional overhead door units by one manufacturer for entire project.
- E. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- F. Wind Loading: Design and reinforce sectional overhead doors to withstand a 20 lb. per sq. ft. wind loading pressure.

1.6 PROJECT CLOSEOUT

A. Warranty:

1. Provide a one-year warranty signed by the manufacturer for the installation and materials of the door. Warranty period to commence on day of Substantial Completion.

PART 2 - PRODUCTS

2.1 SECTIONAL OVERHEAD DOOR MANUFACTURER

A. Subject to compliance with requirements, provide products of one of the following:

1. Kinnear, Div. Harsco
2. Northwest Door, Inc.
3. Overhead Door Co.
4. Raynor Manufacturing Co.
5. Clopay Building Products Co
6. CHI Overhead Doors

B. Basis of Design Product: Overhead Door Company Model 591 Thermacore Door System with motorized operating system.

2.2 DOOR MATERIALS AND CONSTRUCTION

A. Door Curtain: Fabricate sectional overhead door to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide panels of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows.

1. Galvanized Steel Sheet: Galvanized commercial steel, (CS type) per ASTM A653/A653M, G90 and G60 coating class.
2. Panels: Metal/foam/metal sandwich panel construction with PVC thermal break and weather-tight ship-lap design.
 - a. Panel Thickness: 1-5/8 inches.
 - b. Exterior Surface: Ribbed
 - c. Exterior Sheet: .016 inch hot-dipped galvanized
 - d. End Stiles: 16 gauge
3. Insulation: Foamed in place, CFC/HCFC free polyurethane.
 - a. R-Value: 14.86, U-Value: 0.067
4. Air Infiltration: 0.08 cfm/sf at 25 mph,
5. Finish: Baked on Kynar polyvinylidene fluoride high performance coating.

B. Door Configuration and Operation.

1. Weather Stripping: EPDM flexible bulb type strip at bottom section, flexible jamb seals and header seal.
2. Track: Provide track as recommended by manufacturer to suit loading required and clearances available. Minimum standards include:
 - a. 3 inches wide, roll-formed 13 gauge galvanized steel, with galvanized steel mounting brackets.
 - b. Lower track sections adjustable for weathertight fit.
 - c. Horizontal tracks reinforced with minimum 13 gauge galvanized steel angle according to door weight and size
3. Track Configuration Type: High lift
4. Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of diecast aluminum with high strength galvanized aircraft cable. Sized with a minimum 7 to 1 safety factor
 - a. High cycle spring: 50,000 cycles
5. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL 325/2010 requirements for continuous monitoring of safety devices.
 - a. Sensing Edge Protection: Electric sensing edge monitored to meet UL 325/2010.
 - b. Operator Controls: Push-button operated control stations with open, close, and stop buttons. Controls located at the interior, surface mounted, with conduit encased wiring from control to motor.
6. Locking: Interior slide bolt lock for electric operation with interlock switch.
7. Insulated Vision Lites: Full glazed aluminum sash panels with ½ inch tempered insulating glass.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with requirements for substrate construction and other conditions affecting performance of the work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install door, track, and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions and as herein specified.
- B. Fasten vertical track assembly to framing at not less than 24" o.c. Hang horizontal track from structural overhead framing with angle or channel hangers, welded and bolt-fastened in place. Provide sway bracing, diagonal bracing, and reinforcing as required for rigid installation of track and door operating equipment. Paint track and mounting brackets per Division 09 Section "Painting."
- C. Upon completion of installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

END OF SECTION 083613

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood and hollow steel doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Lock cylinders for doors for which hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping, seals and door gaskets.

1.2 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- D. NFPA 80 - Standard for Fire Doors and Other Opening Protective; 2016.
- E. NFPA 101 - Life Safety Code; 2015.
- F. UL (BMD) - Building Materials Directory; current edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. See Division 01 Section "Project Meetings" for pre-installation meeting procedures.
- B. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
- C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- E. Convey Owner's keying requirements to manufacturers.

- F. Pre-installation Meeting: Convene a pre-installation meeting one week prior to commencing work of this section; require attendance by all affected installers.
 - 1. Prior to commencement of hardware work, schedule meeting with Owner, Contractor, Contractor's field superintendent, hardware installer, and other interested parties to review methods and procedures to be used to achieve end results.
- G. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.4 SUBMITTALS

- A. See Division 01 Section "Submittal Procedures" for submittal procedures.
- B. Product Data
 - 1. Hardware: Manufacturer's specifications, maintenance and keying manual, and installation instructions of finish hardware. Include photographs, marked templates and other data required to show compliance with these specifications.
- C. Finish Hardware Schedule.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's (Door & Hardware Institute) "Sequence and Format for Hardware Schedule." Double space entries and number/date each page.
 - 2. Content:
 - a. Identification number, location, hand, fire rating, degree of opening, and material of each door and frame.
 - b. Type, style, function, size, quantity, and finish of each door hardware item.
 - c. Include description and function of each lockset and exit device.
 - d. Complete designations of items required for each door or opening including name and manufacturer.
 - e. Fastenings and other pertinent information on attachment of hardware.
 - f. Explanation of abbreviations, symbols and codes contained in schedule.
 - g. Mounting locations for door hardware.
 - h. Include separate schedule of key and master key system.
 - 3. Approval of this list by Architect does not relieve Contractor of responsibility to provide finish hardware components required for complete operating installation.
- D. Keying Information: Provide keying and bitting information to Owner.
- E. Cut sheets: 1 set of manufacturer cut sheets for each hardware item supplied.
- F. Templates/Diagrams:

1. Deliver templates of approved finish hardware items compatible with other Work.
 2. Electrical diagrams, including riser and point to point hook-up for each door with electrified hardware.
- G. Shop Drawings:
1. Indicate locations and mounting heights of each type of hardware, catalog cuts, electrical characteristics and connection requirements.
 2. Submit manufacturer's parts lists and templates.
- H. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- I. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- J. Maintenance Materials and Tools:
1. See Section 01 60 00 - Product Requirements, for additional provisions.
 2. Provide ten extra key lock cylinders for each master keyed group.
 3. Provide special wrenches and tools applicable to each different or special hardware component.
 4. Provide maintenance tools and accessories supplied by hardware component manufacturer.
- K. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- L. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Provide services of an AHC or DHI member of Door Hardware Institute to:
1. Be available for consultation with Architect/ Owner at no additional cost to Owner during progress of construction.
- B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.
1. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.
 2. Hardware consultant must be an employee of supplier.
- C. Hardware supplier shall have and maintain a factory direct status with manufacturers specified or approved during course of project.

- D. Where several manufacturers are specified for one type of hardware, use only products of one manufacturer.

1.6 REGULATORY REQUIREMENTS

- A. Hardware to comply with applicable local and/or State fire and current building codes.
- B. Hardware installed at doors with U.L. fire-resistant rating to meet required rating.
- C. Doors installed for smoke protection to receive hardware as recommended by NFPA.
- D. Provide hardware per requirements of Building Code for fire door assemblies labeled for fire resistance and smoke control (“S” label).
- E. Electric equipment to have U.L. approved listing for complete assembly.
- F. Comply with requirements of ANSI A117.1. and The Americans with Disabilities Act (ADA) and State Building Code regarding access for disabled.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Individually package each unit of finish hardware, complete with proper fastenings and appurtenances, clearly marked on outside to indicate contents and specific locations in Work.
- B. Provide experienced employee designated to receive, take charge of, and distribute hardware at building site, and provide locked area for storage of hardware.
- C. Protect from damage. Store above ground and under cover.
- D. Stockpile items sufficiently in advance to assure proper and adequate provision in Work of those trades for interface with Work of this Section.

1.8 WARRANTY

- A. See Division 01 Sections “Closeout Procedures” and “Warranty Procedures” for additional warranty requirements.
- B. Warrant operation of Mortise locksets for Lifetime Mechanical and 5 years for Mortise Deadlocks
- C. Warrant operation of closers for Lifetime Mechanical.
- D. Warrant operation of exit devices for 5 years.

1.9 CERTIFICATION

- A. Prior to Substantial Completion Date, provide written certificate that hardware is complete and conforms to Specifications and approved submittals.

1.10 CLOSEOUT SUBMITTALS

- A. As specified in Section 01 78 00.
- B. Operating Tools: Furnish adjusting tools
- C. Keys: Stamp keys for identification and deliver to Owner. Furnish keys for each lock as specified. Use of final keys will not be permitted during construction.
 - 1. Delivery of Hardware: Deliver in unopened containers fully identified with manufacturer's name, number and finish.
 - 2. Furnish each set of keys in separate envelopes packed in temporary key control cartons; do not pack with locks; use envelopes furnished by key control manufacturer. Type each envelope with key cut number, keying data, and location
- D. Operation and maintenance data for review and approval.
 - 1. Operation and maintenance data for hardware.
 - 2. Final typed finish hardware schedule that includes any corrections and changes to submittal schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Best Access Solutions: Stanley, Best, Precision www.bestaccess.com.
- B. Assa Abloy Group: Pemko, Rockwood www.assaabloydss.com
- C. Select Hinges and TIPIT® Hospital Tips: www.select-hinges.com
- D. Trimco, originally called Triangle Brass Manufacturing Co., Inc: www.trimcohardware.com.
- E. KeyWatcher: Morse Watchmans www.info.morsewatch.com
- F. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

- A. Provide products that comply with following:
 - 1. Applicable provisions of Federal, State, and local codes.
 - 2. 36 CFR 1191, ADA Standards for Accessible Design.
 - 3. ADA Standards and ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 - 4. Applicable provisions of NFPA 101, Life Safety Code.
 - 5. Fire-Rated Doors: NFPA 80.

6. Hardware on Fire-Rated Doors: Listed and classified by UL (BMD) as suitable for purpose specified and indicated.
7. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of applicable code.
8. Products Requiring Electrical Connection: Listed and classified by UL (BMD) as suitable for purpose specified and indicated.

2.3 HARDWARE FINISHES

A. Produce finishes as stated herein. Finishes of same designation, which come from more than one source, shall match when items are viewed at arm's length and approximately 2 feet apart.

1. Unless otherwise specified, match finish of each item of hardware with finish selected for lock sets and latches.

2.4 GENERAL

A. Fasteners:

1. Furnish necessary flat head screws, bolts, and other fasteners of suitable size and type to anchor hardware in position for long life under hard use.
2. Where necessary, furnish fasteners with expansion shields, sex bolts, and other anchors as required and recommended by hardware manufacturer.
 - a. Toggle Bolts: Not permitted.
3. Provide fasteners that match hardware finish and material.
4. Conceal if possible when door is in closed position; provide exposed fasteners with Phillips head.
 - a. Through-bolting not permitted.

B. Locks and Latches: Verify:

1. Operation
2. Hand of doors
3. Function for each opening.

C. Closers: Verify for each door:

1. Hand of door
2. Degree of opening
3. Frequency of use
4. Head condition.
 - a. Provide closers which do not limit door swing.
 - b. Furnish drop plates for narrow top rails.

- c. Furnish manufacturer's standard one piece cast arm at parallel arm location.
 - d. Furnish closers at fire-resistant rated doors, exterior doors and elsewhere as shown.
- D. Furnish silencers for door frames at rate of 3 for each single door and 2 for each door or pair of doors; except gasketed doors and doors with light seals or sound seals.
 - 1. Furnish gaskets for rated doors to corridors or other exit ways.
- E. Furnish door stops in number and type to protect finishes wherever doors or hardware could strike adjacent surfaces and materials.
- F. Hardware Locations:
 - 1. Mount hardware at recommended location of manufacturer or per requirements of ICC A117.1.

2.5 KEYING

- A. Factory or locally key following:
 - 1. Furnish Best Cormax patented keying for exterior doors and Best SFIC Standard 7-pin for interior doors to match Owners existing systems
 - 2. Meet with Owner to determine specific keying requirements.
 - a. Furnish keying schedule within 10 days of key meeting for Owner review and approval.
- B. Furnish nickel silver keys for each lock as follows:
 - 1. 3 change keys per cylinder.
 - 2. 6 master keys for each set.
 - 3. 3 grand-master keys (if applicable.)
- C. Construction Keying:
 - 1. Furnish a construction key system with 10 keys for locks and cylinders: 7 for Contractor and 3 for Owner.
 - 2. Use only construction keys during construction.
 - 3. Upon Substantial Completion of Work, void construction key system and, in presence of Architect and Owner, demonstrate specified keying system is operating properly.
- D. Identification and delivery:
 - 1. Stamp permanent keys, "DO NOT DUPLICATE".
 - 2. Provide "Serialization" of keys
- E. Key Control:

1. Re-use existing double in vestibule 100.
2. Provide a new Keywatcher single in West Stair S2 on the east wall.

2.6 PRODUCTS

A. Single Source:

1. Except as specifically otherwise approved in advance by Architect, furnish for each item only product of a single manufacturer.

B. Geared Continuous Hinges:

1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
2. Anti-spinning through fastener
3. UL10C listed for 3 hour Fire rating
4. Non-handed
5. Lifetime warranty
6. Provide Fire Pins for 3-hour fire ratings
7. Sufficient size to permit door to swing 180 degrees

C. Locks and Latches:

1. Mortise Type Locks and Latches:

- a. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.
- b. Furnish UL or recognized independent laboratory certified mechanical operational testing to 4 million cycles minimum.
- c. Provide 9001-Quality Management and 14001-Environmental Management.
- d. Fit ANSI A115.1 door preparation
- e. Functions and design as indicated in the hardware groups
- f. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
- g. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
- h. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
- i. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
- j. Provide sufficient curved strike lip to protect door trim. Anti-friction type
- k. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
- l. Lock shall have self-aligning, thru-bolted trim
- m. Levers to operate a roller bearing spindle hub mechanism

- n. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
 - o. Spindle to be designed to prevent forced entry from attacking of lever
 - p. Provide locksets with 7-pin removable and interchangeable core cylinders
 - q. Each lever to have independent spring mechanism controlling it
 - r. Core face must be the same finish as the lockset.
 - s. Occupancy indicator and lockset assembly to be by same manufacturer and designed for use in this application.
 - t. Unit to be equipped with ADA thumb turn and have simultaneous retraction of latch and deadbolt when inside lever is turned.
2. Anti-Ligature Levers Behavioral Healthcare Solutions shall include components specifically designed to be used as a complete operational system.
 - a. Independent, tapered, bidirectional lever
 - b. Thru-bolted fixed conical escutcheon
- D. Exit Devices:
1. Furnish with provisions for concealed mounting.
 - a. Through-bolts not acceptable unless required by fire codes or fire tests.
 2. Include impact resistant, flush mounted end cap.
 - a. End caps to be of heavy-duty alloy construction and provide horizontal adjustment for flush alignment with device cover plate.
 - b. No raised edges to protrude from end cap.
 3. Furnish with:
 - a. Hydraulic touch pad dampener for quiet operation of device.
 - b. Deadlocking latchbolts and roller strikes.
 4. Filler Plates: Furnish shim kits for flush mounting of exit devices on doors.
 5. Supply plastic installation template.
 6. Tested and approved by BHMA for ANSI 156.3 Grade 1
 7. Furnish UL or recognized independent laboratory certified mechanical operational testing to 10 million cycles minimum
 8. Provide deadlocking latchbolt
 9. Touchpad shall be "T" Style
 10. Exposed components shall be of architectural metals and finishes.
 11. Lever design shall match lockset lever design
 12. Provide strikes as required by application
 13. Fire exit devices shall be listed for UL10C
 14. UL Listed for Accident Hazard

15. Shall consist of a push pad, the actuating portion of which extends across shall no be less than one half the width of the door leaf.
16. Provide vandal resistant or breakaway trim

E. Door Closers:

1. Contractor to advise on submittals which side closers are to be mounted If new installation mount on corridor side if patient area or patient room. Mount inside at storage or non-patient areas.
2. Fasteners: Concealed.
3. Closer to have:
 - a. Heavy duty arms.
 - b. Adjustable spring power with indicator dial.
 - c. Stick-on templates.
 - d. Torx Screw
 - e. Pressure relief valves: Not permitted.
 - f. Delayed action required
 - g. Tested and approved by BHMA for ANSI 156.4 Grade 1
 - h. Maximum 2 7/16 inch case projection with non-ferrous cover
 - i. Separate adjusting valves for closing and latching speed and backcheck
 - j. Lifetime mechanical warranty required.
 - k. Closers shall be non-handed, non-sized and multi-sized
 - l. Conform to ANSI 117.1 ADA requirements
 - m. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions.

F. Stops:

1. Do not use floor stops unless specifically approved by Architect or shown otherwise.
2. If wall stops cannot be installed in contact with lock/latch half of door leaf, provide concealed or surface overhead holder.

G. Kickplates:

1. Metal, as specified in Door Hardware Groups.
2. Secure with torx brand security screws, spaced uniformly at maximum of 5 inches on center at kickplate perimeter.
3. Kickplates:
 - a. 0.050 inch.
 - b. Beveled on 4 edges.

H. Armor plates:

1. Metal, as specified in Door Hardware Groups.
2. Secure with torx brand security screws

I. Emergency Release Stop and Double Swing Hinge:

1. ADA and CMS Compliant
 2. Secure with torx brand security screws
- J. Electronic Key Control: Keywatcher:
1. Patented Smartkey system
 2. Integrates with Lenel OnGuard
 3. 7" touch screen
 4. Modular design

K. Acceptable Manufacturers:

<u>Products:</u>	<u>Manufacturer:</u>	<u>Substitute:</u>
Continuous Hinges:	Select (SEL)	None, Facility Standard
Hospital Tip:	Select TIPIT	None, Facility Standard
Locks/Latches:	Best 40H Series (BES)	None, Facility Standard
Anti-Ligature Levers:	Best SPSL Series (BES)	None, Facility Standard
Emergency Release Stop:	Pemko (PEM)	Or approved equal
Cylinders:	Best (BES)	None, Facility Standard
Exit Devices:	Precision (PHI)	None, Facility Standard
Surface Closers:	Stanley QDC100 (SH)	None, Facility Standard
Concealed Closers:	LCN 2010 (LC)	Dorma, Norton
Stops/Catches:	Trimco (TR)	Don Jo or approved equal
Kickplates:	Trimco (TR)	Don Jo or approved equal
Armor Plate:	Trimco	Don-Jo or approved equal
Flush Pulls:	Trimco (TR)	ABH or approved equal
Weatherstripping/Gasketing:	National Guard (NG)	Pemko or approved equal
Silencers:	Trimco (TR)	Hager or approved equal
Electronic Key Control	Morse Watchman	None, Facility Standard

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions under which Work of this Section will be performed.
1. Correct conditions detrimental to timely and proper completion of Work.
 2. Do not proceed until unsatisfactory conditions are corrected.
- B. Protect work of others from damage.

3.2 COORDINATION

- A. Coordinate with other trades to assure proper and adequate provision in Work of those trades for interface with Work of this Section.

3.3 INSTALLATION

- A. Install Work accordance with:

1. Hardware groups specified.
 2. Approved Schedule.
 3. Applicable requirements of governmental agencies having jurisdiction.
 4. Manufacturer's and referenced standard's recommended installation procedures.
- B. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- C. Mounting heights for hardware from finished floor to center line of hardware item:
1. For hollow metal doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 2. For hollow metal doors and frames: See Section 08 11 13.
 3. For Wood Doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 4. Wood Doors: See Section 08 14 16.
- D. Accurately locate, fit and install square, plumb and true.
1. Provide hairline fit at joints
 2. Securely fasten.
- E. Cut and fit threshold or floor plates to door frame profile and with mitered corner joints; weld multiple pieces together and set in full bead of sealant.
1. At carpet, install closer floor plates flush with structural substrate under carpet.
 2. Secure to substrate with positive anchoring devices.
- F. After fitting mortised hardware to surfaces to be painted, remove and store hardware in original package in secure place until painting is completed, then install permanently.

3.4 CLEANING, ADJUSTMENT, AND PROTECTION

- A. Clean, without damaging, exposed surfaces affected by work of this Section and repair as necessary.
- B. Remove from site refuse created by this Work, and dispose of in legal manner.
- C. Remove protective coating completely from exposed surfaces as soon as progress of Work permits with safety.
- D. Properly wrap hardware subjected to hand usage during construction for protection; hardware finish damaged through carelessness to be replaced at no expense to Owner.
- E. Upon completion of Work, and as condition of its acceptance, provide inspection, and adjustment.
 1. At time of Substantial Completion, during and at end of warranty period, test, adjust and where necessary lubricate moving parts including keyways for free, smooth and quiet operation.

- a. Lubricate locks with fine powdered graphite only.
2. After ventilation system is balanced, hardware manufacturer's representative to adjust closers as necessary to meet ADA and Building Code regarding time required for closing operation and force required to open and provide written report pertaining to overall operation and installation of hardware.

3.5 FINISH HARDWARE GROUPS

SET #01			
4	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32DST
1	Push Plate	1001-3	630 TR
1	Pull Plate	1018-3	630 TR
1	Door Closer	QDC111 SN x Torx screws	689 SH
1	Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630 TR
1	Mop Plate	KO050 10" x 2" LDW B4E CSK x Torx	630 TR
3	Door Silencers	1229A	BLACK TR

SET #02-01 (door opening 125, 128)

4	Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
NRP TORX SCREWS	US32D	ST		
4	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Push Plate	1001-3	630	TR
1	Pull Plate	1018-3	630	TR
1	Door Closer	QDC111 SN x Torx screws	689	SH
1	Kick Plate	KO050 10" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1	Wall Bumper	1270CVPV x Torx	626	TR
3	Door Silencers	1229A	BLACK	TR

SET #02A (door opening B23, B24, B28)

4	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Push Plate	1001-3	630	TR
1	Pull Plate	1018-3	630	TR
1	Door Closer	QDC111 SN x Torx screws	689	SH
1	Kick Plate	KO050 10" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1	Overhead Stop	1020 Series x Torx	US32D	AB
3	Door Silencers	1229A	BLACK	TR

~~SET #03~~

4	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Store Room Lockset	45H-7D3J-PATD	630	BE
1	Door Closer	QDC114 SN x Torx screws	689	SH
1	Wall Bumper	1270CVPV x Torx	626	TR
1	Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
3	Door Silencers	1229A	BLACK	TR

~~SET #03A~~

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Store Room Lockset	45H-7D3J PATD	630	BE
1 Door Closer	QDC114 SN x Torx screws	689	SH
1 Wall Bumper	1270CVPV x Torx	626	TR
1 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
3 Door Silencers	1229A	BLACK	TR

SET #04-03 (door opening B13,213)

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Passage Set	45H-0N3J	630	BE
1 Kick Plate	KO050 10" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1 Wall Bumper	1270CVPV x Torx	626	TR
3 Door Silencers	1229A	BLACK	TR

SET #04A

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32DST	
1 Hospital Latch	45H-0N x 6710 ABH	630	BE
1 Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
1 Door Closer	QDC111 SN x Torx screws	689	SH
1 Overhead Stop	9020 Series x Torx	US32DAB	
3 Door Silencers	1229A	BLACK	TR

SET #05-04 (door opening B11, B12, 143 144, 211, 212, 236, 239, 240, 245)

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Office Lockset	45H-7AB3J PATD	630	BE
1 Wall Bumper	1270CVPV x Torx	626	TR
3 Door Silencers	1229A	BLACK	TR

SET #05A (door opening 145, 213A, 214, 237)

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Office Lockset	45H-7AB3J PATD	630	BE
1 Overhead Stop	1020 Series x Torx	US32D	AB
3 Door Silencers	1229A	BLACK	TR

~~SET #06~~

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Store Room Lockset	45H-7D3J PATD	630	BE
1 Door Closer	QDC115 SN x Torx screws	689	SH

1	Overhead Stop	1020 Series x Torx	US32D	AB
3	Door Silencers	1229A	BLACK	TR
SET #07				
8	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
2	Flush Bolt	W3913	626	TR
1	Dustproof Strike	3911	630	TR
1	Store Room Lockset	45H-7D3J PATD	630	BE
2	Overhead Stop	1020 Series x Torx	US32D	AB
2	Door Silencers	1229A	BLACK	TR
SET #08				
3	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Office Lockset	45H-7AB3J PATD	630	BE
1	Overhead Stop	1020 Series x Torx	US32D	AB
3	Door Silencers	1229A	BLACK	TR

SET #09-06 (door opening 152)

6 Hinges	FBB199 5 X 4 1/2 TORX SCREWS	US32D	ST
1 Exit Device	MLR C 2803 LBR X 1703C	630	PR
1 Exit Device	MLR C 2802 LBR X 1702C	630	PR
1 Rim Cylinder	12E-72 PATD	626	BE
1 Operator	ED 900PR J8 FWPRS	626	DM
2 Power Transfer	EPT-12C		PR
2 Wire Harness	WH-192		ST
2 Wire Harness	WH-50		ST
2 Power Supply	RPSMLR2BB		PR
2 Wall Switch	WS/RFT 1	630	DM
2 Hand held Trans.	HH/RFT 1 433		DM
21 Wall SwitchReceiver	WS/RFT 1RFR 433	630	DM
2 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
2 Overhead Stop	1020 Series x Torx	US32D	AB

NOTE: Card reader is provided by the owner's security vendor.

Operation: ~~presenting a valid credential to the card reader outside~~, pressing a wall mounted actuator or using a remote hand held transmitter initiates the low power operators which signal the exit devices to unlatch to open both door leaves. Authorized use is signaled by the exit devices, and egress is always free from the inside.

SET #10-07 (Dr. Odoor opening B17, B17A, B22, B25, 111, 118, 121, 124, 141, 146, 232, 233, 234, 235, 241)

NOTE: All Hardware is by door manufacturer

SET #11-08 (door opening B07)

4 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
NRP TORX SCREWS	US32D	US32D	ST
4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Exit Device	2103 x 1703A x 4903C	630	PR
1 Rim Cylinder	12E-72 PATD	626	BE
1 Door Closer	QDC115 SN x Torx screws	689	SH
1 Kick Plate	KO050 40" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1 Wall Bumper	1270CVPV	626	TR
3 Door Silencers	1229A	BLACK	TR

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Classroom Lockset	45H-7R3J PATD	630	BE
1 Wall Bumper	1270CVPV	626	TR
1 Door Closer	QDC111 SN x Torx screws	689	SH
1 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
3 Door Silencers	1229A	BLACK	TR

SET #13-09 (door opening B18)

4	Hinges	FBB191 4 1/2 X 4 1/2	
NRP TORX SCREWS	US32D	ST	
1	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Sec screw	CL SP
1	Store Room Lockset	45H-7D3J PATD	630 BE
1	Door Closer	QDC112 x 8Q00470 TJ mount x Torx screws	689 SH
1	Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630 TR
1	Wall Bumper	1270CVPV	626 TR
3	Door Silencers	1229A	BLACK TR

Gaskets and Seals are by door manufacturer.

SET #13A-10 (door opening B10, 220)

4	Hinges	FBB199 5 X 4 1/2 NRP	
TORX SCREWS	US32D	ST	
1	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Sec screw	CL SP
1	Store Room Lockset	45H-7D3J PATD @ Door B10	630 BE
1	Store Room Lockset	45H-7D3J VT PATD @ Door 220	630 BE
		"Vandal resistant lockset option" @ 220	
1	Door Closer	QDC112 x 8Q00470 TJ mount x Torx screws	689 SH
1	Wall Bumper	1270CVPV	626
TR			
1	Armor Plate	KO050 42" x 2" LDW	
B4E CSK x Torx	630	TR	
1	Kick Plate	KO050 8" x 2" LDW B4E CSK x Torx	630 TR
3	Door Silencers	1229A	
BLACK	TR		
1	Overhead Stop	1020 Series x Torx	US32D AB

Gaskets and Seals are by door manufacturer.

SET #14-11 (door opening 140)

1	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Sec screw	CL SP
1	Classroom Lockset	45H-7R3J PATD	630 BE
		Add Classroom Lockset	
1	Deadlock	MS1850S	628
AR			
2	Cylinder	1E-74 PATD	626
BE			
1	Door Closer	QDC112 x 8Q00470 TJ mount x Torx screws	689 SH
1	Push pull bar	1737	630
TR			
1	Kick Plate	KO050 40"-8" x 2" LDW B4E CSK x Torx	630 TR
1	Overhead Stop	1020 Series x Torx	
US32D	AB		
1	Wall Bumper	1270CVPV	626 TR

Gaskets and Seals are by door manufacturer.

SET #14A-12 (door opening 200)

1	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Sec screw	CL	SP
1	Deadlatch	4900 x 4591- 01	628	AR
1	Cylinder	1E-74 PATD	626	BE
1	Door Closer	QDC112 x 8Q00470 TJ mount x Torx screws	689	SH
1	Push bar	1741	630	TR
1	Kick Plate	KO050 408" -x 2" LDW B4E CSK x Torx	630	TR
1	Overhead Stop	1020 Series x Torx	US32D	AB
1	Threshold	325HD x Torx screws	AL	NA

Gaskets and Seals are by door manufacturer.

SET #15-13 (door opening B00)

8	Hinges	FBB199 4 1/2 X 4 1/2	X 4 1/2
NRP TORX SCREWS	US32D	ST	
8	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D ST
2	Exit Device	MLR C 2803 LBR X 1703C	630 PR
2	Rim Cylinder	12E-72 PATD	626 BE
1	Operator	ED 900 J8 SW	626 DM
1	Door Closer	QDC111 x 8Q00470 TJ mount x Torx screws	689 SH
1	Power Transfer	EPT-12C	PR
1	Wire Harness	WH-192	ST
1	Wire Harness	WH-50	ST
1	Power Supply	RPSMLR2BB	PR
2	Wall Switch (1 at door B00)	WS/RFT 1	630
	DM		
2	Kick Plate	KO050 10" 8" x 2" LDW B4E CSK x Torx	630 TR
1	Gasketing Set	137 NA SET x Torx screws (Head & Jambs)	NA
2	Astragal Seal	9125 A	NA
2	Door Sweep	200 NA x Torx screws	NA
1	Saddle Threshold	513 x Torx screws	AL NA

NOTE: Card reader is provided by the owner's security vendor.

Operation: presenting a valid credential to the card reader outside, initiates the low power operators which signal the exit devices to unlatch to open both door leaves. Authorized use is signaled by the exit devices, and egress is always free from the inside. Wall mounted actuator inside for ADA egress. Actuator initiates both the vestibule and exterior doors.

SET #15A-14 (door opening B01)

8	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D ST
2	Exit Device	MLR C 2803 LBR X 1703C	630 PR
2	Rim Cylinder	12E-72 PATD	626 BE
1	Operator	ED 900 J8 SW	
626	DM		
1	Door Closer	QDC111 x 8Q00470 TJ mount x Torx screws	689 SH
1	Overhead Stop/Holder	1010 Series x Torx	US32D AB
1	Power Transfer	EPT-12C	PR
1	Wire Harness	WH-192	ST
1	Wire Harness	WH-50	ST
1	Power Supply	RPSMLR2BB	
PR			
2	Wall Switch (1 at door B0)	WS/RFT 1	630
DM			
2	Kick Plate	KO050 10" 8" x 2" LDW B4E CSK x Torx	630 TR
1	Gasketing Set	137 NA SET x Torx screws (Head & Jambs)	NA
2	Astragal Seal	9125 A	NA
2	Door Sweep	200 NA x Torx screws	NA

1 ~~Saddle Threshold~~Safety Tread
screws AL

~~513-3504~~ x Torx
NA

Add Stop / Holder

~~NOTE: Card reader is provided by the owner's security vendor.~~

~~Operation: presenting a valid credential to the card reader outside, initiates the low power operators which signal the exit devices to unlatch to open both door leaves. Authorized use is signaled by the exit devices, and egress is always free from the inside. Wall mounted actuator inside for ADA egress. Actuator initiates both the vestibule and exterior doors.~~

SET #16-15 (door opening 100A, 102A)

2	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Security screws	CL	SP
2	Dummy Bar	N673DR	630	PR
2	Exit Device Trim	2902A	630	PR
1	Operator	ED 900 J8 SW	626	DM
1	Door Closer	QDC111 x 8Q00470 TJ mount x Torx screws	689	SH
1	Frame Switch		FS-1	630
	DM			
12	Wireless Wall-Switch		WS/RFT-1482A1U	
	630	DMSDC		
2	Surface Mount Box	400-1B		SDC
2	Wireless Transmitter	400W1 - 433		SDC
1	Wireless Receiver	400RC - 433		SDC
1	Push-a-Actuator		CL2388 x	CL2236
	mounting box	630		PR
2	Kick Plate	KO050-10" 8" x 2" LDW B4E CSK x Torx	630	TR
2	Overhead Stop	1020 Series x Torx	US32D	AB
1	Safety Tread	3504 x Torx screws	AL	NA
1	Saddle Threshold	513 x Torx screws	AL	NA

NOTE: Card reader is provided by the owners' security vendor.

Operation: presenting a valid credential to the card reader outside, initiates the low power operators which open both door leaves. Wall mounted actuator inside for ADA egress. Actuator initiates both the vestibule and exterior doors.

Gaskets and Seals are by door manufacturer.

SET #16A (door opening 201)

2	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Security screws	CL	SP
2	Dummy Bar	N673DR	630	PR
2	Exit Device Trim	2902A	630	PR
2	Door Closer	QDC111 x 8Q00470 TJ mount x Torx screws	689	SH
2	Kick Plate	KO050 10" 8" x 2" LDW B4E CSK x Torx	630	TR
2	Overhead Stop	1020 Series x Torx	US32D	AB
1	Saddle Threshold	513 x Torx screws	AL	NA

SET #17

4	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32DST	
1	Store room Lockset	45H-7D3J PATD	630 BE	
1	Overhead Stop	1020 Series x Torx	US32DAB	
3	Door Silencers	1229A	BLACK	TR

SET #17A

4	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32DST	
1	Store room Lockset	45H-7D3J PATD	630 BE	
1	Wall Bumper	1270CVPV	626 TR	
3	Door Silencers	1229A	BLACK	TR

SET #18-17 (door opening 100, 102)

2	Continuous Hinge SP	SL57HD EPT PREP W/TIPIT ANTI LIG x Sec sc. rew		CL
1	Exit Device	MLR C 2603 LBR X 2908A	630	PR
1	Exit Device	2602 LBR X 2902A	630	PR
1	Rim Cylinder	12E-72 PATD	626	BE
1	Operator	ED 900 J8 SW	626	DM
1	Door Closer	QDC112 x 8Q00470 TJ mount x Torx screws	689	SH
1	Power Transfer	EPT-12C		PR
1	Wire Harness	WH-192		ST
1	Wire Harness	WH-50		ST
1	Power Supply	RPSMLR2BB		PR
1	Wireless Switch	482A1U		SDC
1	Surface Mount Box	400-1B		SDC
1	Wireless Transmitter	400W1 - 433		SDC
1	Wireless Receiver	400RC - 433		SDC
1	Frame Switch (exterior doors)	FS-1	630	DM
1	Wall Switch (vestibule doors)	WS/RFT 1	630	DM
2	Overhead Stop	1020 Series x Torx	US32D	AB
2	Kick Plate	KO050 10" 8" x 2" LDW B4E CSK x Torx	630	TR
1	Saddle Threshold	513-325HD x Torx screws	AL	NA

NOTE: Card reader is provided by the owner's security vendor. Card reader or intercom activates auto operator.

Operation: presenting a valid credential to the card reader outside, initiates the low power operator which signals the

exit device to unlatch to open one door leaf. Authorized use is signaled by the exit devices, and egress is always

free from the inside. Actuator inside for ADA egress. Actuator initiates both the vestibule and exterior

doors. Card reader or intercom activates the operator.

Gaskets and Seals are by door manufacturer.

				<u>SET #19</u>
1	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Security screws	CL	SP
1	Privacy	SPSL ML LTF-16F	630	BE
1	Door Closer	2010 Series	689	LC
1	Wall Bumper	1270CVPV	626	TR
1	Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
3	Door Silencers	1229A	BLACK	TR

SET #20-18 (door opening 114, 122, 153)

1	Set Pivots		0147	3/4	SEC
1	US32D	AB			
1	Intermediate Pivots		019	3/4	SEC
1	US32D	AB			
1	Continuous Hinge	SL57HD EPT PREP W/TIPIT ANTI LIG x Sec sc.	CL		SP

1	Continuous stainless steel "Swing Clear" hinges		
1	Lockset	45H-7TD3J PATD	630 BE
1	Door Closer	QDC115 SN x Torx screws	689 SH
1	Wall Bumper		1270CVPV
626	TR		
1	Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630 TR
1	Wall mount Dr. Stop & Holder	1260	626 TR
1	Gasketing Set	137 NA SET x Torx screws	NA
1	Door Sweep	200 NA x Torx screws	NA
1	Safety Tread	3504 x Torx screws	AL NA
1	Saddle Threshold	513 x Torx screws	AL NA

SET #21-19 (door opening B16)

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Store room Lockset	45H-7D3J PATD	630	BE
1 Door Closer	QDC115 SN x Torx screws	689	SH
1 Kick-Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
1 Wall mount Dr. Stop 1260 & Holder		626	TR
3	Door Silencers	1229A	
BLACK	TR		
1 Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

SET #22-20 (door opening 206, 210)

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Classroom Lockset	45H-7R3J PATD	630	BE
1 Door Closer	QDC111 SN x Torx screws	689	SH
1 Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
1	Wall mount Dr. Stop & Holder	1260	626
TR			
1 Wall Bumper	1270CVPV x Torx	626	TR
3	Door Silencers	1229A	
BLACK	TR		
1 Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

SET #22A1 (door opening 110)

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Classroom Lockset	45H-7R3J PATD	630	BE
1 Door Closer	QDC111 SN x Torx screws	689	SH
1 Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
1 Overhead Stop	1020 Series x Torx	US32D	AB
1 Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

~~SET #23~~

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Passage Set	45H-0N3J	630	BE
1 Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
1 Wall Bumper	1270CVPV x Torx	626	TR
3 Door Silencers	1229A	BLACK	TR

SET #24-22 (door opening 103, 202)

1 Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Security screws	CL	SP
1 Privacy	SPSL-ML-LTF-16F	630	BE
1 Door Closer	2010 with bumper Series	689	LC
1 Wall Bumper	1270CVPV	626	TR
1 Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR

3	Door Silencers	1229A
BLACK	TR	
1	Smoke Gasket	5050B (Head & Jambs) "Anti-Ligature" BLACK TR

~~—SET #25~~

- ~~—8 Hinges FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS US32D ST~~
- ~~—2 Exit Device MLR C 2208 LBR X 4908C 630 PR~~
- ~~—2 Rim Cylinder 12E-72 PATD 626 BE~~
- ~~—1 Set of Operators ED 900PR J8 FWPR 626 DM~~
- ~~—2 Power Transfer EPT-12C PR~~
- ~~—2 Wire Harness WH-192 ST~~
- ~~—2 Wire Harness WH-50 ST~~
- ~~—2 Power Supply RPSMLR2BB PR~~
- ~~—2 Wall Switch WS/RFT 1 630 DM~~
- ~~—2 Kick Plate KO050 48" x 2" LDW B4E CSK x Torx 630 TR~~
- ~~—2 Wall Bumper 1270CVPV 626 TR~~

~~Operation: When active pressing the wall switch initiates the low power operators which signal the Exit devices to unlatch opening both doors. Egress is always free from the inside. Key switch disables or enables the hall wall switch for security.~~

SET #236 (door opening B30)

8 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Flush Bolt	3917-18	626	TR
1 Flush Bolt	3917-12	626	TR
1 Dustproof Strike	3911	630	TR
1 Store Room Lockset	45H-7D3J PATD	630	BE
1 Door Closer	QDC112 SN x Torx screws	689	SH
—1	Wall Bumper	1270CVPV	626
—	TR		
<u>1 Overhead Stop</u>	<u>1020 Series x Torx</u>	<u>US32D</u>	<u>AB</u>
1 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
1 Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

SET #27-24 (door opening B00A, B01A)

4 Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
—1	Passage Set	45H-0N3J	630
—	BE		
1 Exit Device	2103 x 4903C	630	PR
1 Rim Cylinder	12E-72 PATD	626	BE
	Add Exit Device		
1 Door Closer	QDC111 SN x Torx screws	689	SH
—1	Mop Plate	KO050 10" x 1" LDW	
B4E CSK x Torx	630	TR	
1 Kick Plate	KO050 40" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1 Wall Bumper	1270CVPV	626	TR
<u>1 Threshold (B00A only)</u>	<u>325HD x Torx screws</u>	<u>AL</u>	<u>NA</u>

3	Door Silencers	1229A	
BLACK	TR		
1	Smoke Gasket	5050B (Head & Jambs)	BLACK TR

SET #28-25 (door opening B05, B08, B09, B27, 104, 105, 151, 207, 209, 230, 231, 244)

4	Hinges	FBB191 4 1/2 X 4 1/2	
NRP TORX SCREWS	US32D	ST	
4	Hinges	FBB191 5 X 4 1/2 NRP TORX SCREWS	US32D ST
1	Store Room Lockset	45H-7D3J PATD	630 BE
1	Door Closer/ st /stop	QDC119 SN x Torx screws	689 SH
1	Wall Bumper	1270CVPV	626 TR
1	Armor Plate (@ door 104)	KO050 42" x 2" LDW B4E CSK x Torx	630 TR
1	Smoke Gasket	5050B (Head & Jambs)	BLACK TR

SET #28A-26 (door opening B03, B04, B06, 208)

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Store Room Lockset	45H-7D3J PATD	630	BE
1 Door Closer/ stop	QDC119-QDC115 SN x Torx screws	689	SH
<u>1 Overhead Stop</u>	<u>1020 Series x Torx</u>	<u>US32D</u>	<u>AB</u>
1 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
1 Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

SET #29-27 (door opening B18A, B20, B26, B29, B29A, B30A)

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Hospital Latch	45H-7R3J	PATD x
6710 ABH	630	BE	
<u>1 Passage Set</u>	<u>45H-0N3J</u>	<u>630</u>	<u>BE</u>
1 Door Closer/ Hold Open	QDC112 SN x Torx screws	689	SH
1 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
1 Wall Bumper	1270CVPV	626	TR
3 Door Silencers	1229A	BLACK	TR

~~SET #30~~

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Store Room Lockset	45H-7D3J PATD	630	BE
1 Wall Bumper	1270CVPV	626	TR
3 Door Silencers	1229A	BLACK	TR

SET #31-28 (door opening 163)

4 Hinges	FBB199 4-1/25 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Store Room Lockset	45H-7D3J PATD	630	BE
1 Door Closer / Holder	QDC112 SN x Torx screws	689	SH
1 Kick Plate	KO050 40" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1 Overhead Stop	1020 Series x Torx	US32D	AB
1 Safety Tread	3504 x Torx screws	AL	NA
1 Saddle Threshold	513 x Torx screws	AL	NA
1 Gasketing (Head & Jambs)	103 NA FATT Torx Screws		NA
1 Auto Door Bottom	420 NA Torx Screws		NA

SET #32-29 (door opening 229)

4 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Classroom Lockset	45H-7R3J	PATD
630	BE		
<u>1 Store Room Lockset</u>	<u>45H-7D3J PATD</u>	<u>630</u>	<u>BE</u>
1 Door Closer	QDC115 SN x Torx screws	689	SH
1 Wall mount Dr. Stop & Holder	1260	626	TR
3	Door Silencers	1229A	
BLACK	TR		

1 Smoke Gasket 5050B (Head & Jambs) BLACK TR

—SET #33

— 2	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Security screws	CL	SP
— 2	Dummy Bar	N673DR	630	PR
— 2	Exit Device Trim	2902A	630	PR
— 2	Door Closer	QDC111 x 8Q00470 TJ mount x Torx screws	689	SH
— 2	Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
— 2	Overhead Stop	1020 Series x Torx	US32D	AB

Gaskets and Seals are by door manufacturer.

—SET #34

— 1	Continuous Hinge	SL57HD W/TIPIT ANTI LIG x Sec screw	CL	SP
— 1	Deadlatch	4510 x 4560	628	AR
— 2	Cylinder	1E-74 PATD	626	BE
— 1	Door Closer	QDC112 x 8Q00470 TJ mount x Torx screws	689	SH
— 1	Push pull bar	1737	630	TR
— 1	Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
— 1	Overhead Stop	1020 Series x Torx	US32D	AB

Gaskets and Seals are by door manufacturer.

—SET #35

— 4	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
— 1	Passage Set	45H-0N3J	630	BE
— 1	Door Closer	QDC111 SN x Torx screws	689	SH
— 1	Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
— 1	Wall Bumper	1270CVPV	626	TR
— 3	Door Silencers	1229A	BLACK	TR

—SET #36

— 4	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
— 1	Classroom Lockset	45H-7R3J PATD	630	BE
— 1	Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
— 3	Door Silencers	1229A	BLACK	TR

—SET #37

— 4	Hinges	FBB191 4 1/2 X 4 1/2 NRP TORX SCREWS	US32D	ST
— 1	Exit Device	2103 x 1703A	630	PR

1	Rim Cylinder	12E-72 PATD	626	BE
1	Door Closer	QDC115 SN x Torx screws	689	SH
1	Kick Plate	KO050 10" x 2" LDW B4E CSK x Torx	630	TR
1	Wall Bumper	1270CVPV	626	TR
3	Door Silencers	1229A	BLACK	TR

SET #38-30 (door opening B19, 126, 129, 148, 149, 203, 226, 227)

4	Hinges	FBB191 4 1/2 X 4 1/2		
NRP TORX SCREWS	US32D	ST		
4	Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1	Privacy	45H-0L3JVIN	630	BE
1	Door Closer	QDC111SN x Torx screws	689	SH
1	Kick Plate	KO050 10" x 2" 8" x 2" LDW B4E CSK x Torx	630	TR
1	Wall Bumper	1270CVPV	626	TR
3	Door Silencers	1229A		
BLACK	TR			
1	Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

SET #39-31 (door opening 147)

8 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Exit Device	2303 x 4903C	630	PR
1 Rim Cylinder	12E-72 PATD	626	BE
<u>Add Exit Device</u>			
1 Flush Bolt	3917-18	626	TR
1 Flush Bolt	3917-12	626	TR
1 Dustproof Strike	3911	630	TR
1	Classroom Lockset	45H-7R3J	PATD
630	BE		
<u>Change to Storeroom Lockset</u>			
1 Door Closer	QDC112 SN x Torx screws	689	SH
1 Wall Bumper	1270CVPV	626	TR
1 Armor Plate	KO050 42" x 2" LDW B4E CSK x Torx	630	TR
1 Smoke Gasket	5050B (Head & Jambs)	BLACK	TR

SET #40-32 (door opening B21, 127, 150)

8	Hinges	FBB191 4 1/2 X 4	ST
1/2 NRP TORX SCREWS	US32D		
8 Hinges	FBB199 5 X 4 1/2 NRP TORX SCREWS	US32D	ST
1 Flush Bolt	3917-18	626	TR
1 Flush Bolt	3917-12	626	TR
1 Dustproof Strike	3911	630	TR
1 Store Room Lockset	45H-7D3J PATD	630	BE
2 Overhead Stop	1020 Series x Torx	US32D	AB
2 Door Silencers	1229A	BLACK	TR

SET #33 (door opening 212A)

1 Bypass track set	BPC250N		ST
2 Recessed Pull	1060	US26D	TR

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Window units.
 - 2. Vision lites.
 - 3. Entrances and other doors.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 08 Section "Hollow Metal Doors and Frames."
 - 2. Division 08 Section "Flush Wood Doors."
 - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
 - 4. Division 08 Section "Glazed Aluminum Curtainwalls."
 - 5. Division 08 Section "Aluminum Windows."
 - 6. Division 08 Section "Sectional Overhead Doors" for glazing in vision lites at service doors.
 - 7. Division 08 Section "Glazing Surface Films" for security and graphic films applied to glazing assemblies.

1.3 DEFINITIONS

- A. Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.
- B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's directions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's directions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated glass standard.
- D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use due to causes other than glass breakage and improper practices for maintaining, and cleaning insulating glass. Evidence of failure is the obstruction of vision by dust, moisture, or film

on the interior surfaces of glass. Improper practices for maintaining and cleaning glass do not comply with the manufacturer's directions.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
 - a. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
 - b. Basic Wind Speed: Per Structural Drawings.
 - c. Exposure Category: Per Structural Drawings.
 - 2. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.
 - 3. Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm (0.23 inch).
 - 4. Minimum glass thickness, nominally, of lites in interior walls is 6.0 mm (0.23 inch).
 - a. Glass thicknesses at interior lites shall be sufficient to prevent glass deflection that exceeds 0.25 inches.
 - 5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 SUBMITTALS

- A. Product data for each glass product and glazing material indicated.
- B. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.
- C. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.
- D. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.
- E. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 01.
- F. Samples of each type of glazing proposed on the project. Provide 2 (each) 12" by 12" square samples of each glazing assembly.

1.6 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. FGMA Publications: "FGMA Glazing Manual."
 - 2. AAMA Publications: AAMA TIR-A7 "Sloped Glazing Guidelines" and "Glass Design for Sloped Glazing."
 - 3. LSGA Publications: "LSGA Design Guide."
 - 4. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines" and TB-3001 "Sloped Glazing Guidelines."
- B. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. (0.84 sq. m) in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. (0.84 sq. m) or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

3. Location of Safety Glazing: Refer to IBC, 2012 Edition Section 2406.3, Hazardous Locations.
- C. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
 1. Insulating Glass Certification Council (IGCC).
 2. Associated Laboratories, Inc. (ALI).
 3. National Certified Testing Laboratories (NCTL).
- D. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.
- E. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:
 1. Primary glass of each (ASTM C 1036) type and class indicated.
 2. Heat-treated glass of each (ASTM C 1048) condition indicated.
 3. Laminated glass of each (ASTM C 1172) kind indicated.
 4. Insulating glass of each construction indicated.
- F. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 1. Install liquid sealants at ambient and substrate temperatures above 40 deg F (4.4 deg C).

1.9 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

- B. Manufacturer's Warranty on Coated Glass Products: Submit written warranty signed by coated glass manufacturer agreeing to finish replacements for those coated glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
 - 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

- C. Manufacturer's Warranty on Laminated Glass: Submit written warranty signed by insulating glass manufacturer agreeing to furnish replacements for those laminated glass units that deteriorate as defined in the "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
 - 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

- D. Manufacturer's Warranty on Insulating Glass: Submit written warranty signed by manufacturer of insulating glass agreeing to furnish replacements for insulating glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.
 - 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and if applicable, form, finish, mesh and pattern.

- B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and if applicable, form, finish, and pattern.

- C. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- E. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- F. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes basic-protection testing requirements in ASTM E 1996 for wind loads as indicated on drawings when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.
 - 1. Large-Missile Test: For glazing located within 30 feet (9.1 m) of grade.
 - 2. Small-Missile Test: For glazing located more than 30 feet (9.1 m) above grade.
- G. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 - 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 FLAT GLASS MATERIALS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
- C. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
- D. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.

1. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is required by the IBC.

2.3 LAMINATED GLASS

- A. Laminated Glass: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified.
- B. Interlayer: Interlayer material is indicated below, clear or frosted, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
- C. Interlayer Material: Polyvinyl butyral sheets or cured resin, white diffused laminate on interior surfaces. At exterior laminated glass provide urethane water resistant type laminate.
- D. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

2.4 HEAT-TREATED FLOAT GLASS PRODUCTS, GENERAL

- A. Fabrication Process: By horizontal (roller-hearth) free of tong marks. Provide in constituent glass sheets in making up laminated glass.

2.5 INSULATING GLASS PRODUCTS

- A. Sealed Insulating Glass Units: Preassembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated. Provide at all exterior openings subject to building heat loss or gain. All glazing lites shall be heat strengthened if required by insulated glass unit manufacturer or to resist thermal forces for configurations specified.
 1. For properties of individual glass lites making up units, refer to requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products comprising lites of insulating glass units.
 2. Performance characteristics designated for coated insulating glass are nominal values based on manufacturer's published test data for units with lites 6.0 mm (0.23 inch) thick and nominal 1/2-inch dehydrated space between lites, unless otherwise indicated.
 3. Performance Classification per ASTM E 774: Class A.
 4. Outdoor Lite: Laminated on first surface at any openings within 10'-0" of adjacent grade or interior floor level, tempered elsewhere.
 5. Sealing System: Manufacturer's standard.
 6. Spacer Material: Manufacturer's standard metal.
 7. Desiccant: Manufacturer's standard.
 8. Corner Construction: Manufacturer's standard corner construction.
- B. Low-E Insulating-Glass Units:

1. Basis-of-Design Product: "Solarban 72 Starphire" by PPG Industries or a comparable product by one of the following:
 - a. AFG Industries Inc.
 - b. Viracon.
 - c. Pilkington Building Products North America.
 - d. Guardian
2. Overall Unit Thickness and Thickness of Each Lite: 1 inch overall unit thickness with glass lite thickness of 1/4 inch and 1/2 inch airspace.
3. Outdoor Lite: Laminated on first surface at any openings within 10'-0" of adjacent grade, tempered elsewhere.
4. Indoor Lite: Tempered.
5. Visible Light Transmittance: 71 percent minimum.
6. Winter Nighttime U-Factor: 0.29 maximum.
7. Summer Daytime U-Factor: 0.27 maximum.
8. Solar Heat Gain Coefficient: 0.30 maximum.
9. Outdoor Visible Reflectance: 13 percent + or - 5%.
10. Low-E Coating: Second surface.
11. Silk Screen Ceramic Frit: Provide GlasPro-HDDP silk screen ceramic frit:
 - a. Locations: On Surface No. 2 at locations indicated on Drawings.
 - b. Graphic Image: Custom to be provided by Architect.

2.6 ELASTOMERIC GLAZING SEALANTS

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 4. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Elastomeric Glazing Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements, including those referencing ASTM classifications for Type, Grade, Class and Uses.

1. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Glazing Sealant Product Data Sheet, provide products, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, with the capability to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
 1. Neoprene, ASTM C 864.
 2. EPDM, ASTM C 864.
 3. Silicone, ASTM C 1115.
 4. Thermoplastic polyolefin rubber, ASTM C 1115.
 5. Any material indicated above.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following companies:
 1. Preformed Gaskets:
 - a. Advanced Elastomer Systems, L.P.
 - b. Schnee-Morehead, Inc.
 - c. Tremco, Inc.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonextruding, nonoutgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.

2.10 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass from edge damage during handling and installation as follows:
 - 1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
 - 2. Remove damaged glass from Project site and legally dispose of off-site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass sizes larger than 50 united inches (length plus height) as follows:
 - 1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each lite is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
Secure compression gaskets in place with joints located at corners to compress gaskets producing a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- B. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- C. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass. Install pressurized gaskets to protrude slightly out of channel to eliminate dirt and moisture pockets.

3.7 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 088000

SECTION 089000 – LOUVERS AND VENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Extent of louvers are indicated on drawings, including indications of sizes and locations.

B. Related Sections:

- 1. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
- 2. Division 07 Section "Roof Accessories" for roof curbs.
- 3. Division 07 Section "Joint Sealants" for field-applied sealants.
- 4. Division 23 Sections for vents specified as part of those sections.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

1.4 QUALITY ASSURANCE

- A. Performance Requirements: Where louvers are indicated to comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with Air Movement and Control Association (AMCA Standard 500).
- B. Field Measurements: Verify size, location and placement of louver units prior to fabrication.
- C. Factory Assembly: Coordinate field measurements and shop drawings with manufacturer and factory assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Pre-assemble units in factory to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following or approved:
1. Vertical Blade Louvers: Basis of Design Product: Construction Specialties, Inc. Model BLV-5709. Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved.
 - a. Industrial Louvers, Inc.
 - b. Ruskin.
 - c. American Warming and Ventilating.

2.2 VERTICAL BLADE LOUVERS

- A. BLV-5709: Extruded aluminum frames and blades shall be one piece 6063-T6 alloy, designed to collect and drain water to the exterior at the sill. Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads. Mullions shall be sliding interlock type. Blades to be one-piece aluminum extrusions with front lip gutter and multiple secondary gutters designed to catch and direct water to sill. Louvers to be supplied with 4 inch high by full depth sill flashings formed from minimum 0.050 inch thick aluminum. Louvers shall have a minimum of 45.7% free area based on a 48" wide x 48" high size. Louver shall be factory assembled by the louver manufacturer.
1. Frame: 5" deep. .081" nominal wall thickness.
 2. Blades: Nominal wall thickness of .081 inches.
 3. Screen: 3/4" x .051 expanded, flattened aluminum bird screen in removable frame.

2.3 MATERIALS - LOUVERS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
1. Use types and sizes to suit unit installation conditions.
- E. Post installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to four times the loads imposed for concrete, or six times the load imposed for

masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL

- A. Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thickness' indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; air leakage, where applicable (for adjustable units, if any); strength; durability; and uniform appearance.
- B. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.
- C. Maintain equal louver blade spacing to produce uniform appearance.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide sill extensions and loose sills and head drip flashings made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.
- F. Join frame members to one another and to stationary louver blades by welding, or mortise and tenon, except where indicated otherwise or where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

2.5 METAL FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces with protective covering, prior to shipment. Remove scratches and blemishes from exposed surfaces which will be visible after completing finishing process.
 - 1. Polyvinylidene Fluoropolymer Coating; Manufacturer's standard three-coat, thermo-cured, full-strength PVDF coating consisting of 0.8 mil thick primer and finished with 0.8 mil thick, 70% Hylar 5000 (by Ausimont), Kynar (by Atochem), or Duranar (by PPG) PVDF coating and 0.8 mil clear coat. Thickness and flat sheen of 10% at 85 degree reflective gloss when testing in accordance with ASTM D 523.
 - 2. Durability: Provide coating that has been field tested under normal range of weathering conditions for minimum of twenty (20) years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 ASTM D 424; and without fading in excess of five (5) NBS units per ASTM D 2244.
 - 3. Color: Manufacturer's standard Black.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.3 INSTALLATION

- A. Locate and place louver units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather tight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations require for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations, and refinish entire unit, or provide new units, at Contractor's option.
- E. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.
- F. Provide concealed gaskets, flashings, joint fillers, and insulation, and install as work progresses to make installations weather tight.
- G. Refer to Division 07 Sections for sealants in connection with installations of louvers

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products prior to Substantial Completion.

END OF SECTION 089000

SECTION 092116 – GYPSUM BOARD SHAFT-WALL ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes:
 - 1. Gypsum board shaft wall assemblies as detailed on the Drawings.
- B. Related Sections:
 - 1. Division 01 Section “Sustainable Requirements.”
 - 2. Division 09 Section “Gypsum Board Assemblies” for requirements referenced in this Section for applying and finishing gypsum board over liner panels of gypsum board shaft-wall assemblies.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this Section or other referenced standards.

1.4 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Performance Requirements, General: Provide gypsum board shaft-wall assemblies that comply with the following requirements:
 - 1. They are composed of proprietary gypsum board panels and metal components designed for erection from outside the shafts.
 - 2. They comply with performance requirements specified as determined from testing manufacturers’ standard assemblies representing those indicated for this Project.
- B. Fire Resistivity: Fabricate and install gypsum board shaft-wall assemblies to have fire-resistance rating of 1-hour minimum.
- C. Structural Performance Characteristics: Engineer, fabricate, and install gypsum board shaft-wall assemblies to withstand the following lateral design loads (air pressures) without failing and while maintaining an airtight and smoke-tight seal. Apply design loads transiently and cyclically under in-service conditions for maximum heights of partitions indicated. Evidence of failure includes deflections exceeding those indicated

below, bending stresses causing studs to break or to distort, and end-reaction shear causing runners to bend or to shear and studs to become crippled.

1. Lateral Design Load: 10 psf.
2. Deflection Limit: 1/240 of partition height, except where otherwise indicated.

1.5 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product data from manufacturers for each type of gypsum board shaft-wall assembly specified.
- C. Engineering data from gypsum board shaft-wall assembly manufacturer certifying and substantiating compliance of gypsum board shaft-wall assemblies with structural performance requirements.
- D. Assembly test reports from a qualified independent testing agency certifying and substantiating compliance of gypsum board shaft-wall assemblies with structural and sound-attenuation performance requirements based on tests performed on manufacturers' standard assemblies representing those indicated.
- E. Fire-test-response reports from testing and inspecting agency substantiating compliance of gypsum board shaft-wall assemblies with fire-resistivity performance.
 1. Include data substantiating that elevator entrances and other items indicated as penetrating gypsum board shaft-wall assemblies do not negate fire resistance rating requirements.
- F. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence each assembly's compliance with requirements and with the building code in effect for Project..

1.6 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Cut sheets or letters from product manufacturers indicating that gypsum board, acoustic ceiling systems, wall base, wall covering products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate

compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products

1.7 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide gypsum board shaft-wall assemblies that comply with the following requirements:
 - 1. Fire-resistivity tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency includes UL, Warnock Hersey, or another agency performing testing and follow-up services that is acceptable to authorities having jurisdiction.
 - 2. Gypsum board wall assemblies indicated are identical in materials and construction to those tested for fire resistivity per ASTM E 119.
 - 3. Fire-resistance-rated assemblies are indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual," design designations listed in the UL "Fire Resistance Directory," or by Warnock Hersey or another qualified testing and inspecting agency.
- B. Single-Source Responsibility: Obtain components for gypsum board shaft-wall assemblies from a single manufacturer for each type of assembly indicated.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal trim and framing components.

1.9 PROJECT CONDITIONS

- A. Comply with requirements for environmental conditions, room temperatures, and ventilation specified in the following Division 09 Section "Gypsum Board Assemblies."

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All gypsum board, acoustic ceiling systems, wall base, wall covering products used at the project shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Dietrich Industries, Inc.
 2. Domtar Gypsum.
 3. Georgia-Pacific Corp.
 4. Gold Bond Building Products Div., National Gypsum Co.
 5. United States Gypsum Co.
 6. *SCAFCO (Addendum 2)*

2.3 BASIC ASSEMBLY MATERIALS

- A. General: Provide standard materials and components listed in manufacturer's published product literature for gypsum board shaft-wall assemblies of type and application indicated. Provide gypsum and other panels in maximum lengths available to eliminate or minimize end-to-end butt joints and in thicknesses required to produce assemblies complying with structural and other performance requirements.
- B. Steel Framing: ASTM C 645, of profile, size, and base metal thickness required to produce assemblies complying with Part 1 "Assembly Performance Requirements" Article; with sectional properties computed to conform with AISI "Specification for the Design of Cold-Formed Steel Structural Members"; and as follows:
1. Protective Coating: Manufacturer's standard corrosion-resistant coating.
- C. Gypsum Liner Panels: Proprietary liner panels as required for the specific fire-resistant-rated gypsum board shaft-wall assemblies indicated, with moisture-resistant paper facings.
- D. Gypsum Sheathing: As specified in Section 09 29 00, type as required by fire-resistant assembly indicated.
- E. Accessories: Corner beads, edge trim, and control joints of material and shapes specified in the Division 09 Section "Gypsum Board Assemblies" that comply with gypsum board shaft-wall assembly manufacturer's recommendation for application indicated.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum board shaft-wall construction that comply with requirements indicated and recommendations of gypsum board shaft-wall assembly manufacturer.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum boards of type indicated.
- C. Steel drill screws complying with ASTM C 1002 for fastening gypsum board to steel members less than 0.03 inch thick.

- D. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.
- E. Runner Fasteners: Provide fasteners of size and material required to withstand loading conditions imposed on shaft-wall assemblies without exceeding allowable design stress of runners, fasteners, or structural substrates where anchors are embedded.
 - 1. Postinstalled Expansion Anchors: Where indicated, provide expansion anchors with the capability to sustain, without failure, a load equal to 5 times that imposed by shaft-wall assemblies, as determined from testing per ASTM E 488 by a qualified independent testing agency..

2.5 BASIC ASSEMBLY DESCRIPTION

- A. General: Characteristics of selected components are described below for purposes of indicating proprietary gypsum board shaft-wall assemblies that are manufacturer's standard. Provide complete shaft-wall assemblies that comply with requirements indicated in this Article and Part 1 "Assembly Performance Requirements" Article.
- B. Cavity Shaft-Wall Assemblies: Provide assemblies constructed of proprietary gypsum liner panels inserted between steel tracks at each end of studs; with specially shaped steel studs engaged in tracks and fitted between gypsum liner panels; and with gypsum sheathing on finished side or sides applied to studs in the number of layers, thicknesses and arrangement indicated.
 - 1. Gypsum Liner Panel Thickness: As standard with manufacturer for gypsum board shaft-wall assemblies indicated.
 - 2. Stud Shape: C-H.
 - 3. Stud Thickness: As standard with manufacturer for gypsum board shaft-wall assemblies indicated.
 - 4. Stud Depth: Not less than 4 inches unless noted otherwise on Drawings.
 - 5. Outside Finish: 1 or 2 layers 5/8-inch-thick gypsum sheathing.
 - 6. Shaft-Side Finish: As required by manufacturer to achieve 1- or 2-hour fire rating as indicated on Drawings.
 - 7. Cavity Insulation: As required by manufacturer to achieve 1- or 2-hour fire rating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board shaft-wall assemblies attach or abut with Installer present. Substrates include hollow metal frames, elevator hoistway door frames, cast-in anchors, and structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of gypsum board shaft-wall assemblies. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Attach offset anchor plates or ceiling runners (tracks) to structure. Where offset anchor plates are required, install continuous units formed from hot-dip galvanized sheet steel of thickness indicated. Fasten plates to building structure with fasteners spaced not more than 24 inches o.c. Secure ceiling runners to offset plates with screws spaced 24 inches o.c.

3.3 INSTALLATION OF GYPSUM BOARD SHAFT-WALL ASSEMBLIES

- A. General: Install gypsum board shaft-wall assemblies to comply with performance and other requirements indicated as well as with manufacturer's installation instructions and the following:
 - 1. ASTM C 754 for installing steel framing.
 - 2. Division 9 Section "Gypsum Drywall" for applying and finishing gypsum wallboard.
 - 3.
- B. Install supplementary framing in gypsum board shaft-wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft-wall assembly framing.
 - 1. Support elevator hoistway door frames independently of shaft-wall framing assemblies, or reinforce assemblies according to assembly manufacturer's instructions.
- C. At penetrations in shaft wall, maintain fire-resistance rating of entire shaft-wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- D. Seal gypsum board shaft-walls at perimeter of each section that abuts other work and at joints and penetrations within each section. Install acoustical sealant to withstand dislocation by air pressure differential between shaft and external spaces; comply with manufacturer's instructions and ASTM C 919.
- E. In elevator shafts where gypsum board shaft-wall assemblies cannot be positioned within 2 inches of the shaft face of structural beams, floor edges, and similar projections into shaft, install 1/2-inch- or 5/8-inch-thick gypsum board cants covering tops of projections as follows:
 - 1. Slope cant panels not less than 75 degrees with the horizontal. Set base-edge of panels in gypsum board adhesive and secure top edges to shaft walls at 24 inches o.c. with screws fastened to shaft-wall framing.
 - 2. Where needed to support gypsum board cants, install steel studs spaced 24 inches o.c.; extend studs from top of projection to shaft-wall framing behind cant.

3.4 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to Installer that ensures gypsum board shaft-wall assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 092116

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
- 2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
- 3. Resilient channels.
- 4. Penetration barrier mesh for security

- B. Related Sections: The following Sections contain requirements that relate to this Section:

- 1. Division 05 Section "Cold Formed Metal Framing" for load bearing steel framing.
- 2. Division 06 Section "Rough Carpentry" for wood framing, blocking and furring.
- 3. Division 07 Section "Building Insulation" for insulation and vapor retarders installed in gypsum board assemblies.
- 4. Division 07 Section "Through-Penetration Firestop Systems" for firestopping systems and fire-resistance-rated joint sealants.
- 5. Division 09 Section "Gypsum Board Assemblies" for gypsum wallboard attached to walls and ceilings.

1.3 SUBMITTALS

- A. Product Data: For each type of product.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep dry and protected against damage from weather, surface contamination, corrosion, construction traffic, and other causes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. All non-load bearing framing members, where not otherwise indicated, shall be of gauge/thickness as determined by supplier/installer based upon design performance calculations for each applicable wall condition but, in no case, lighter than 20 gauge.
 - 1. Provide appropriate member sizes, spacings and gauges in accordance with ICC-ES Report No. ER-4943P span tables to comply with the requirements listed below. Provide calculations stamped by a licensed professional engineer for conditions not included in span tables.
 - 2. Maximum lateral deflection of walls shall be $L/120$ under a 5 PSF lateral pressure, except for walls supporting brick veneer which shall be framed in accordance with the Architectural/Structural drawings. In general, do not vary stud widths from Architectural drawings without prior approval. Install appropriate headers and jamb studs at wall openings to support wall and ceiling loads.
 - 3. Size ceiling joists for a maximum $L/480$ deflection.
- B. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- D. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40 (Z120) hot-dip galvanized unless otherwise indicated.

- B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.
1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: 0.018 inch.
 - b. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above of up to 1-1/2 inches.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
 - 2) MBA Building Supplies; FlatSteel Deflection Track.
 - 3) Steel Network Inc. (The); VertiClip SLD Series.
 - 4) Superior Metal Trim; Superior Flex Track System (SFT).
 - 5) Telling Industries; Vertical Slip Track.
 - 6) *SCAFCO (Addendum 2)*
- D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
 - b. Grace Construction Products; FlameSafe FlowTrak System.
 - c. Metal-Lite, Inc.; The System.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.033 inch.

- F. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.018 inch.
 - 2. Depth: As indicated on Drawings.

- H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
 - 1. Product: Provide Clark Dietrich “RC Deluxe Single-Leg Resilient Channel”, *SCAFCO Serenity Resilient Channel (Addendum 2)* or approved equal.

- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges.
 - 1. Depth: As indicated on Drawings.
 - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

- J. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 1-1/4 inches, minimum uncoated-metal thickness of 0.018 inch, and depth as indicated on Drawings.

- K. Penetration barrier Mesh for Security: High strength expanded metal mesh attached directly to steel framing beneath gypsum wall panels with mesh manufacturer’s standard clips.
 - 1. Material: Type II, Class 1 carbon steel mesh complying to ASTM F1267.
 - 2. Configuration: 16 gauge (0.048” thick), One inch diamond pattern, 38 lbs per 100 SF, 80 percent open area.
 - 3. Basis of Design Product: Clark Dietrich BM-10-16F.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

- C. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch wide flanges.
 - 1. Depth: As indicated on Drawings.
- E. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 - 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.018 inch.
 - b. Depth: As indicated on Drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base-Metal Thickness: 0.018 inch.
 - 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide asphalt saturated organic felt or foam gasket.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.

2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
1. Screw to framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c. or as indicated on Drawings.
- F. Z-Furring Members:
1. Erect insulation as detailed and hold in place with Z-furring members spaced 24 inches o.c. unless otherwise indicated.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Barrier Mesh:
1. Barrier Mesh sheets may be installed with diamond running in direction most suitable.
 2. Install with manufacturer's clips to secure mesh to the framing members. Mesh joints shall begin, join, and terminate on a framing member. Joints may join staggered or butt together.
 3. Barrier mesh sheets not joining at a framing member shall be wire tied with 18 gauge steel tie wire. Wire tying shall be no less frequent than the installation of mesh clips.
- H. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

- a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 3. Do not attach hangers to steel roof deck.
 4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 – GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes:

- 1. Interior gypsum board.
- 2. Exterior gypsum soffit board.
- 3. Closures at intersection of partition walls and interior storefront glazing.

- B. Related Sections:

- 1. Division 01 Section “Sustainable Requirements.”
- 2. Division 05 Section “Cold Formed Metal Framing” for load bearing steel framing.
- 3. Division 06 Section “Rough Carpentry” for wood blocking and furring.
- 4. Division 06 Section “Sheathing” for exterior sheathing applied over metal framing.
- 5. Division 07 Section “Building Insulation” for insulation and vapor retarders installed in gypsum board assemblies.
- 6. Division 07 Section “Through-Penetration Firestop Systems” for firestopping systems and fire-resistance-rated joint sealants.
- 7. Division 07 Section “Non-Structural Metal Framing” for non-load bearing steel framing.
- 8. Division 09 Section “Ceramic Tile” for tile backer board.

- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

- D. Cut sheets or letters from product manufacturers indicating that gypsum board, acoustic ceiling systems, wall base, wall covering products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products

1.5 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

1.6 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All gypsum board, acoustic ceiling systems, wall base, wall covering products used at the project shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved:

- a. CertainTeed
- b. G-P Gypsum.
- c. National Gypsum Company
- d. USG Corporation.

- B. Type X:

1. Thickness: 5/8 inch unless noted otherwise.
2. Long Edges: Tapered.

- C. Water-Resistant Backing Board: Gypsum product meeting ASTM C 630, and ASTM D3273 for resisting the growth of mold and mildew. Moisture resistant core with inorganic coated glass fiber mats imbedded into face and back. Tapered edges and of type and thickness indicated below and in maximum lengths available to minimize end-to-end butt joints.

1. Location: All backing for plastic laminate and FRP.
2. Core: 5/8 inch Type X unless noted otherwise.
3. Long Edges: Tapered.
4. Size: 4 feet by 8 feet minimum.
5. Products: Subject to compliance with requirements, provide one of the following products or approved:

- a. "Densarmor Plus," Georgia-Pacific Gypsum.

- D. Abuse-Resistant Gypsum Board: ASTM C 1629, Level 2

1. Core: 5/8 inch Type X unless noted otherwise.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
4. Manufactured to produce greater surface abrasion (ASTM D 4977), surface indentation (ASTM D 5420), soft-body impact (ASTM E 695) than regular-type Type X gypsum board.
5. Products: Subject to compliance with requirements, provide one of the following or approved:

- a. Fiberock Brand VHI (Very High Impact Abuse Resistance) by United States Gypsum Company.

2.4 EXTERIOR GYPSUM SOFFIT BOARD

- A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edge.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or as approved:
 - a. CertainTeed
 - b. G-P Gypsum
 - c. National Gypsum Company
 - d. USG Corporation
 2. Core: ½ inch , regular type, tapered, Type X.

2.5 CLOSURES AT INTERSECTION OF PARTITIONS AND STOREFRONT WINDOWS

- A. Adjustable closures at storefront mullions: Pre-assembled, spring loaded, insulated and gasketed closures matching profile size of storefront mullion.
 1. Material: Aluminum with powder coat finish to match storefront mullion color.
 2. Acoustical performance: STC 38.
 3. Quality Standard Product: Gordon Mullion Mate adjustable partition closure.
- B. Closures at storefront glazing: Class A rated closure with fire-resistant foam core within silicon coating.
 1. Quality Standard Product: Emseal Quiet Joint®

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Formed metal faced with paper tape. Sheet steel zinc-coated by hot-dip process. Fed. Spec. QQ-S-775-d, Type 1, Class E.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Expansion (control) joint. Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable cap.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard: Paper reinforcing tape.
 - 2. Backer Board, Gypsum (Coated Glass Mat): Fiberglass joint tape. 10" x 10".
- C. Joint Compound:
 - 1. Drying-Type Joint Compounds: Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use.
 - a. Ready Mix Formulation: Factory-premixed product.
 - b. Taping compound formulated for embedding tape and for first coat over fasteners and flanges of corner beads and edge trim.
 - c. Topping compound formulated for fill (second) and finish (third) coats.
 - 2. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
 - a. For filling joints and treating fasteners of water-resistant gypsum backing board for ceramic tile, use formulation recommended by gypsum board manufacturer.
 - 3. Joint Compound for Tile Backing Panels (DensArmor Plus): Fiberglass mesh tape, bedded with gypsum setting-type joint compound. Following coats may be regular joint compound.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
- D. Thermal Insulation: As specified in Division 07 Section "Building Insulation."
- E. Vapor Retarder: As specified in Division 07 Section "Building Insulation."
- F. Primer-Surfacer (Tuff-Hide):
 - 1. Manufacturer: USG Sheetrock Brand Tuff-Hide is ready mixed, 60% solids, latex skim coat and primer, formulated for a one coat 9.8-13 mils DFT application.

2. Location: As noted on the drawings.

2.9 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
 1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.10 VOC LIMIT

- A. Refer to VOC limit tables in Section 018119 for VOC limits for products in this section.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. All gypsum board shall be held 3/8 inch minimum above finish floor. Install closed cell backer rod and sealant in joint.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

- F. Form control and expansion joints with space between edges of adjoining gypsum panels.
- G. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- H. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- I. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. On all walls and ceilings as indicated on the drawings and noted on the room finish schedule.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

2. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install showers, where indicated. Install with 1/4 inch gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and at locations indicated on Drawings.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 2. LC-Bead: Use at exposed panel edges.
 3. L-Bead: Use where indicated.
 4. U-Bead: Use at exposed panel edges.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Gypsum Board Finish Levels: Provide the following levels of gypsum board finish per Northwest Wall and Ceiling Bureau, Seattle, WA (1-206-524-4243):
 1. Level 1: (Fire-taping for plenum areas above ceilings, in attics, in areas where the assembly would generally be concealed): All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tape and fastener heads need not be covered with joint compound. Tool marks and ridges are acceptable.
 2. Level 2: (For ceramic tile, acoustic tile, and plastic laminate wainscot backing board): All joints, interior angles, and accessories, shall have tape embedded in joint compound. Wipe off the excess leaving a thin coat of joint compound over the tape of all joints, angles, and accessories. Cover fastener heads with one coat

of joint compound and wipe off the excess. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

a. Use the following joint compound combination as applicable to the finish levels specified:

1) Embedding and First Coat: Light weight setting compound.

3. Level 4: (For all other surfaces): All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration. All joint compound shall be smooth and free of tool marks and ridges.

D. Use the following joint compound combination as applicable to the finish levels specified:

1. Embedding and First Coat: Ready-mixed, drying-type, taping compound.

2. Fill (Second) Coat: Ready-mixed, drying-type, topping compound.

3. Finish (Third) Coat: Ready-mixed, drying-type, topping compound.

E. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.7 INSTALLING PARTITION CLOSURES AT STOREFRONT WINDOWS

A. Install closures after partitions and storefront are in place. Follow manufacturer's instructions to assure tight fit and acoustical performance.

B. Clean closures and adjacent glass after installation.

3.8 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.

2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:

a. Installation of 80 percent of lighting fixtures, powered for operation.

b. Installation, insulation, and leak and pressure testing of water piping systems.

c. Installation of air duct systems.

- d. Installation of air devices.
- e. Installation of mechanical system control air tubing.
- f. Installation of ceiling support framing.

3.9 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 – CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Ceramic wall tile.
 - 2. Porcelain wall tile.
 - 3. Tile backer board.
 - 4. Metal edge strips installed as part of tile installations.
- B. Related Sections include the following:
 - 1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Division 09 Section "Gypsum Board Assemblies" for moisture resistant gypsum board.

1.3 DEFINITIONS

- A. Module Size: Actual tile size plus joint width indicated.
- B. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

- A. Comply with the recommendations of ANSI A108 and A118, and the installation practices published in the Tile Council of North America (TCA) Handbook for Ceramic, Glass and Stone Tile Installation, most recent edition.
- B. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6 static COF.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Full-size units of each type of trim and accessory.
- D. Product Certificates: For each type of product, signed by product manufacturer.
- E. Material Test Reports: For each tile-setting and -grouting product.
- F. Provide maintenance information for the cleaning and maintenance of the grout and ceramic tile for inclusion in Operations & Maintenance Data Manuals.

1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
 - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
 - 1. Waterproofing.
 - 2. Joint sealants.
 - 3. Tile backer units.
- D. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Build mockup of each type of floor tile installation.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - 3. Build mockup of each type of wall tile installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

- C. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1. Installation Standards.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.2.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 - 1. See "Finish Key" on Finish Schedule Drawing.
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
 - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.2 TILE PRODUCTS

- A. Glazed Ceramic Wall Tile (CT-3.1, CT-3.2 and CT-3.3):
 - 1. Basis of Design Product: Daltile “Modern Dimensions.”
 - 2. Size, Finish, Color: As indicated on the Room Finish Schedule.
 - 3. Thickness: 1/4 inch.
 - 4. Edges: Manufacturer’s standard square with bullnose edges.
- B. Porcelain Tile (CT-3.4):
 - 1. Basis of Design Product: Daltile “Exhibition Colorbody Porcelain Tile.”
 - 2. Size, Finish, Color: As indicated on the Room Finish Schedule.
 - 3. Thickness: 3/8 inch.
 - 4. Base and Corner Trim: As indicated on the Room Finish Schedule.
- C. Glazed Ceramic (CT-3.5):
 - 1. Basis of Design Product: Daltile “Modern Dimensions, Wave Wall Tile.”
 - 2. Size, Finish, Color: As indicated on the Room Finish Schedule.
 - 3. Thickness: 5/16 inch.
 - 4. Edges: Manufacturer’s standard square with bullnose edges.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers:
 - 1. Atlas Minerals & Chemicals, Inc.
 - 2. Boiardi Products Corporation.
 - 3. Bonsal, W. R., Company.
 - 4. Bostik.
 - 5. C-Cure.
 - 6. Custom Building Products.
 - 7. DAP, Inc.
 - 8. Jamo Inc.
 - 9. LATICRETE International Inc.
 - 10. MAPEI Corporation.
 - 11. Southern Grouts & Mortars, Inc.
 - 12. Summitville Tiles, Inc.
 - 13. TEC Specialty Products Inc.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
 - 1. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
 - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
- C. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.

1. Polymer Type: Either ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
 - a. Unsanded grout mixture for joints 1/8 inch and narrower.
 - b. Sanded grout mixture for joints 1/8 inch and wider.

2.4 TILE BACKER BOARD

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178 with manufacturer's standard edges.
 1. Tile backing for all locations except in shower rooms.
 2. Products: Subject to compliance with requirements, provide the following:
 - a. CertainTeed Corp.; GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 3. Core: 5/8 inch, Type X.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Joint Compound for Tile Backer Board: As recommended by backing panel manufacturer.

2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar and grout products; and easily removable after grouting is completed without damaging grout or tile.
 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- C. Edge Protection Strip: Provide strip Model "SCHIENE" as manufactured by Schluter Systems, or approved. Stainless Steel with a trapezoid-perforated anchoring leg connected to an 87 degree angled vertical section with a 1/8" wide sloped top flange. Height of unit to flush to 1/32" below top of tile.
 1. Installation: Shall be installed according to manufacturer's specifications at edge of tile and at outside corners.

- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
 - 1. Products:
 - a. Bonsal, W. R., Company; Grout Sealer.
 - b. Bostik; CeramaSeal Grout Sealer.
 - c. C-Cure; Penetrating Sealer 978.
 - d. Custom Building Products; Grout and Tile Sealer.
 - e. Jamo Inc.; Penetrating Sealer.
 - f. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
 - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
 - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - i. TEC Specialty Products Inc.; TA-256 Penetrating Silicone Grout Sealer.

2.6 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Grout tile to comply with requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (latex-portland cement grouts), comply with ANSI A108.10.
- H. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.
- I. At showers, install tile backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panel:
 - 1. Comply with ASTM C 840.

2. Butt backer boards panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
 3. All backer boards shall be held 3/8 inch minimum above finish floor. Install closed cell backer rod and sealant in joint.
 4. Locate edge and end joints over supports,. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
 5. Form control and expansion joints with space between edges of adjoining gypsum panels.
 6. Cover both faces of support framing with backer panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - a. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - b. Fit gypsum panels around ducts, pipes, and conduits.
 - c. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
 7. Isolate perimeter of backer board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 8. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 FINISHING COATED GLASS MAT BACKER BOARD (EXPOSED AREA ABOVE WAINSCOT)

- A. General: Treat backer board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare backer board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, and beveled edges, and damaged surface areas.
- C. Apply joint tape over backer board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.

- a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.6 FINISHING COATED GLASS MAT BACKER BOARD (NON-EXPOSED WALL SURFACE AREA BEHIND WAINSCOT)

- A. At beveled joints install fiberglass tape and trowel in with thin-set flush with backer board. After it sets sand lightly.

3.7 WATERPROOFING INSTALLATION (AT SHOWER AREAS)

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.8 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series tile installation standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
 1. Glazed Wall Tile: 1/16 inch.

3.9 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile areas. Protect installed tile work during construction period to prevent staining, damage, and wear.
- C. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 093013

dj/July 18, 2017

SECTION 095113 – ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Acoustic lay-in panels.
 - 2. Suspended grid system.
 - 3. Suspended grid system, acoustic cloud.
 - 4. Suspension systems, moldings and trim.
- B. Related Sections:
 - 1. Division 01 Section “Sustainable Requirements.”
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance Coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved: The General Contractor shall be responsible for the generation of a single set of scaled reflected ceiling plans in which all of the suppliers and installers of overhead materials, i.e. ceiling grid, lights, sprinklers, smoke detectors, grilles, ducts, etc., can meet and coordinate their individual requirements for space and installation needs. The General Contractor shall also be responsible for the scheduling of such coordination meetings.
 - 1. Ceiling suspension system members.
 - 2. Method of attaching hangers to building structure.

- a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 4. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
1. Acoustical Panel: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.
 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch-long Samples of each type, finish, and color.
 3. Metal Slats with Wood Veneer: Set of 18-inch-long samples.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- E. Maintenance Data: For finishes to include in maintenance manuals.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Cut sheets or letters from product manufacturers indicating that gypsum board, acoustic ceiling systems, wall base, wall covering products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to NVLAP for testing indicated.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Build mockup of typical ceiling area as shown on Drawings, including section of linear metal ceiling with wood veneer.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Acoustical Ceiling Panels: Full-size panels equal to 5 percent of quantity installed.

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All gypsum board, acoustic ceiling systems, wall base, wall covering products used at the project shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 75 or less.

2.3 ACOUSTICAL PANELS, GENERAL

- A. Low-Emitting Materials: Acoustical panel ceilings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.
- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- E. Acoustical Panel Standard: Comply with ASTM E 1264.
- F. Glass-Fiber Acoustical Insulation: Provide 2-inch un-faced fiberglass insulation batts on top of linear metal ceiling system. Install batts in manner that conceals batts from visual exposure.

2.4 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. Ceiling Panel C-1:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries "Cortega (No. 747)" or a comparable product by one of the following or approved:
 - a. CertainTeed Corporation.
 - b. Chicago Metallic Corporation.
 - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - 2. Classification: Fiberglass rectangular lay-in panel for 15/16-inch grid.
 - 3. Color: White.
 - 4. LR: Not less than 0.82.
 - 5. NRC: Not less than 0.55.
 - 6. CAC: 40.
 - 7. Size: 24 inches by 48 inches by 5/8 inch thick.

B. Ceiling Panel C-2:

1. Basis of Design: Subject to compliance with requirements, provide Armstrong World Industries "Ultima Health Zone High NRC (No. 1448)" or a comparable product by one if the following or approved:
 - a. CertainTeed Corporation.
 - b. Chicago Metallic Corporation.
 - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
2. Classification: Mineral fiber square lay-in panel with square edge for 15/16-inch exposed grid.
3. Color: White
4. LR: Not less than 0.86.
5. NRC: Not less than 0.80
6. CAC: 35
7. Mold/Mildew Inhibitor: Bioblock, ASTM D 3273.
8. Size: 24 inches by 48 inches by 1 inch thick.

C. Ceiling Panel C-3:

1. Basis of Design: Subject to compliance with requirements, provide Armstrong World Industries "Armstrong Cirrus Second Look III (No. 514)" or a comparable product by one if the following or approved:
 - a. CertainTeed Corporation.
 - b. Chicago Metallic Corporation.
 - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
2. Classification: Mineral fiber square lay-in panel with beveled tegular edge for 15/16-inch exposed grid.
3. Color: White
4. LR: Not less than 0.85.
5. NRC: Not less than 0.65
6. CAC: 35
7. Mold/Mildew Inhibitor: Bioblock, ASTM D 3273.
8. Size: 24 inches by 48 inches by 3/4 inch thick.

2.5 METAL SUSPENSION GRID SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

1. At the Elementary School Stage, Room E203, and at other locations indicated on the Drawings, provide "Tech Black" factory painted grid.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
 3. Painted Wire: At Panel C-2a locations paint wires black.
- E. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.6 METAL SUSPENSION GRID SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Basis of Design Product: The design for the Acoustic Ceiling Grid System is based on Armstrong World Industries, Inc. "Prelude XL." Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved:
- a. CertainTeed Corporation.
 - b. Chicago Metallic Corporation.
 - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. (Typical Grid unless noted otherwise) Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation, with prefinished 15/16-inch-wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Steel cold-rolled sheet.
 5. Cap Finish: White

- C. Seismic Clips: Provide Armstrong, or approved, seismic clip “BERC2” at point of connection between grid system and perimeter ceiling edge molding.

2.7 METAL EDGE MOLDINGS AND TRIM

- A. Products: Subject to compliance with requirements, provide one of the following or approved:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation.
 - 3. Chicago Metallic Corporation.
 - 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
 - 1. Provide Armstrong World industries, Inc. “Flex Molding No. 7890” and “Shadow Molding No. 7871” at locations that abut a vertical surface.
 - 2. Provide Armstrong World industries, Inc. “Axiom AX4STR” trim channel and “Axiom “AX4QSOS” pre-mitered corners at all lay-in acoustical grid clouds or where ceiling grid does not abut a vertical surface.

2.8 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, provide one of the following or approved:
 - 1. Acoustical Sealant for Concealed Joints:
 - a. OSI Sealants, Inc.; Pro-Series SC-175 Rubber Base Sound Sealant.
 - b. Pecora Corporation; BA-98.
 - c. Tremco, Inc.; Tremco Acoustical Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panels and suspension system, including necessary hangers, grillage, splines, and other supporting hardware, in accordance with ASTM C 636, 2003 IBC, CISCA's "Ceiling Systems Handbook," (UL Design) and any applicable code requirements.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 7. Do not attach hangers to steel deck tabs.
 - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
 - 1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 - 2. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections and prepare reports:
 - 1. Suspended ceiling system.
 - 2. Hangers, anchors and fasteners.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096229 - CORK FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cork floor tile.
- B. Related Sections include the following:
 - 1. Division 01 Section "Equilibrium of Relative Humidity of Concrete Testing" for concrete slab testing procedures.
 - 2. Division 03 Section "Cementitious Floor Underlayment" for concrete floor patching and leveling.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Full-size units of each type, color, pattern, and finish of cork flooring required.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of cork flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Cork Flooring: Furnish one box for every 50 boxes or fraction thereof, of each type, color, pattern, and finish of cork flooring installed.

1.6 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.

- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets or letters from product manufacturers indicating that flooring products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store cork flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store cork flooring on flat surfaces.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 60 deg F or more than 85 deg F where relative humidity is between 50 and 70 percent, in spaces to receive cork flooring during the following time periods:
 - 1. 72 hours before installation.
 - 2. During installation.
 - 3. 72 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 60 deg F or more than 85 deg F.
- C. Close spaces to traffic during cork flooring installation.
- D. Close spaces to traffic for 72 hours after cork flooring installation.
- E. Install cork flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All resilient flooring, laminate flooring, engineered and/or prefinished wood flooring, tile flooring with factory-applied organic coatings/sealants products used at the project shall comply with the requirements of the California Department of Health Services Standard

Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For cork flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class II.

2.3 CORK FLOOR TILE

A. Composition: 100 percent natural cork bark and recycled cork granules and set in a natural or synthetic, flexible resin matrix; homogeneous and uniform in composition throughout the tile thickness.

1. Quality Standard Product: Duro Design glue down cork tile.

B. Nominal Density: 30 lb/cu. ft. (500 kg/cu. m), minimum.

C. Nominal Thickness: 5/16 inch.

D. Nominal Size: 12 by 24 inches.

E. Factory Finish: Stained and sealed.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: 100 % portland cement-based formulation provided or approved by cork flooring manufacturer for applications indicated.

B. Adhesive: Water-resistant products as recommended by flooring and adhesive manufacturers to suit cork flooring and substrate conditions indicated.

2.5 FIELD-APPLIED FINISHES

A. Finish Coatings: Four finishing urethane coats as recommended by cork flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of cork flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to cork flooring manufacturer's written instructions to ensure adhesion of cork flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by cork flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by cork flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
4. Moisture Testing: Perform tests recommended by cork flooring manufacturer, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install cork flooring until materials are same temperature as space where they are to be installed.

1. At least 72 hours in advance of installation, move cork flooring products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by cork flooring.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing cork flooring.

B. Mix together floor tiles from each carton to ensure uniform distribution of shade.

C. Discard broken, cracked, chipped, or deformed floor tiles.

- D. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
- E. Lay floor tiles square with room axis.
- F. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- G. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- I. Adhere flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 FIELD-APPLIED FINISHES

- A. First sweep and then vacuum the unvarnished cork floor.
- B. Mix and handle varnish according to manufacturer's instructions.
- C. Apply finishes according to cork flooring manufacturer's written instructions. Allow to dry a minimum of 2 hours between coats.
- D. Finish Coatings: Apply four coats, switching directions during each coat. Lightly manually scuff between the second and third coats using #180-220 grit sanding paper.
- E. Allow to dry overnight before walking on the surface. Do not use drop cloths on the flooring until varnish is entirely dry.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting cork flooring.
- B. Perform the following operations after completing cork flooring installation and final coat of varnish is dry:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect cork flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover cork flooring until Substantial Completion.

END OF SECTION 096229

SECTION 096513 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wall base.
 - 2. Resilient molding accessories.
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor covering.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated for color comparison.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.

- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets or letters from product manufacturers indicating that flooring products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide resilient stair accessories with a critical radiant flux classification of Class I, not less than 0.45 W/sq. cm, as determined by testing identical products per ASTM E 648 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All resilient flooring, laminate flooring, engineered and/or prefinished wood flooring, tile flooring with factory-applied organic coatings/sealants products used at the project shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles, or approved.

2.3 RESILIENT WALL BASE

- A. Basis of Design Product: Resilient wall base is based on “Johnsonite, Traditional Perceptions.” Subject to compliance with requirements, and the Architect's color approval (10 days minimum prior to bid) shall determine the final acceptance of a comparable product by one of the following or approved:
 - 1. Armstrong World Industries, Inc.
 - 2. Burke Mercer Flooring Products.
 - 3. Endura Rubber Flooring; Division of Burke Industries, Inc.
 - 4. Flexco (USA), Inc.
 - 5. Mondo Rubber International, Inc.
 - 6. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
- B. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TS (rubber, vulcanized thermoset).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: Cove (base with toe).
- C. Minimum Thickness: 0.125 inch.
- D. Height: As indicated on Drawings.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Premolded.
- G. Inside Corners: Field made.
- H. Finish: Matte.

- I. Finish and Patterns: As indicated on Drawings.

2.4 RESILIENT MOLDING ACCESSORY

- A. Basis of Design Product: The design for resilient molding accessories is based on "Johnsonite Resilient Transitions." Subject to compliance with requirements, and the Architect's color approval (10 days minimum prior to bid) shall determine the final acceptance of a comparable product by one of the following or approved:
 - 1. Armstrong World Industries, Inc.
 - 2. Burke Mercer Flooring Products.
 - 3. Marley Flexco (USA), Inc.
- B. Accessories shall include but not be limited to the following:
 - 1. Linoleum/Sheet Vinyl to Concrete: Transition between linoleum or sheet vinyl to concrete to be Johnsonite SSR-XX-B.
 - 2. All transition strips to match the color of the base in that room.
- C. Material: Rubber.
- D. Colors and Patterns: As indicated on Drawings.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 1. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 RESILIENT WALL BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch wall base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 1. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Use protection methods recommended in writing by manufacturer.

END OF SECTION 096513

SECTION 096516 – RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Resilient sheet floor coverings.
 - 2. Slip-resistant safety flooring.
- B. Related Sections include the following:
 - 1. Division 01 Section “Equilibrium of Relative Humidity of Concrete Testing” for concrete slab testing procedures.
 - 2. Division 03 Section “Cementitious Floor Underlayment” for concrete floor patching and leveling.
 - 3. Division 09 Section "Resilient Wall Base and Accessories" for resilient wall base, reducer strips, and other accessories installed with sheet floor coverings.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections of each different color and pattern of floor covering required.
- C. Heat-Welded Seam Samples: For each flooring product and welding bead color and pattern combination required; with seam running lengthwise and in center of 6-by-9-inch (150-by-230-mm) Sample applied to a rigid backing and prepared by Installer for this Project.
- D. Maintenance Data: For floor coverings to include in maintenance manuals.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.

- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.
- F. Cut sheets or letters from product manufacturers indicating that flooring products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project that are competent in heat-welding techniques required by manufacturer for floor covering installation.
 - 1. Engage an installer who employs workers for this Project that are trained or certified by floor covering manufacturer for heat-welding techniques required.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store rolls upright.

1.7 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C) >.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.

- E. Install floor coverings after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, in roll form and in full roll width for each color, pattern, and type of floor covering installed.

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All resilient flooring, laminate flooring, engineered and/or prefinished wood flooring, tile flooring with factory-applied organic coatings/sealants products used at the project shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 RESILIENT SHEET FLOOR COVERING

- A. Basis of Design Product: Resilient sheet floor covering is based on Forbo “Marmoleum Linoleum Sheet Resilient Floor Covering.” Subject to compliance with requirements, provide the named product or the following comparable product as approved.
 - 1. Armstrong “LinoArt Linoleum Sheet.”
 - a. Colors and Patterns: See Finish Schedule on Drawings.
- B. Resilient Sheet Floor Covering With Backing: ASTM F 1913, Class 1, Type A.
 - 1. Overall Thickness: 2.5 mm.
- C. Colors and Patterns: See Finish Schedule on Drawings.
- D. Sheet Width: 79 inches.
- E. Seaming Method: Heat welded.
- F. Fire-Test-Response Characteristics:
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2. N.B.S. Smoke chamber Test (ASTM-E-662): <450.

2.3 SLIP RESISTANT SAFETY FLOORING

- A. Slip Resistant Sheet Vinyl Manufacturer: Altro USA, Telephone 800.377.5597, Fax 610.746.4325; E-Mail Assistance: info@altrofloors.com
- B. Acceptable material: Altro "Walkway" (measurements and product weights given below are approximate):
 1. Slip Resistance D .78 / W .80.
 2. Weight: 4.97 lbs./square yard.
 3. Thickness: 0.08 inches.
 4. Roll Width: 79 inches.
 5. Roll Length: 66 feet.
 6. Color: As indicated on Finish Schedule on Drawings.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Reference Division 03 Section "Cementitious Floor Underlayment."
- B. Adhesives: Water-resistant type recommended by manufacturer to suit products and substrate conditions indicated.
 1. Adhesives shall have a VOC content of not more than 60 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Heat-Welding Bead: Solid-strand product of floor covering manufacturer.
 1. Color: Match floor covering.
- D. Integral-Flash-Cove-Base Accessories:
 1. Cove Strip: 1-inch radius provided or approved by manufacturer.
 2. Cove-Base Cap Strip: Square metal provided or approved by manufacturer.
- E. Floor Cleaner: Provide floor cleaning products as recommended by manufacturer.
- F. Floor Sealer: Provide protective liquid floor sealer products as recommended by manufacturer.
- G. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
 - 4. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing. Verify results as in conformance to flooring warranty provisions of finish flooring manufacturers.
 - 5. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours or other rate as accepted by flooring manufacturer.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement or other percent relative humidity as accepted by flooring manufacturer.
 - c. Verify results as in conformance to flooring warranty provisions of finish flooring manufacturers.
 - 6. Move floor coverings and installation materials into spaces where they will be installed at least 72 hours in advance of installation.

- a. Do not install floor coverings until they are the same temperature as space where they are to be installed.

7. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions for installing floor coverings.
- B. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- C. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- D. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on subfloor. Use chalk or other nonpermanent marking device.
- E. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- F. Install floor coverings on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of floor covering installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.
- G. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
- H. Integral Flash Cove Base: Cove floor coverings 6 inches (152 mm) up vertical surfaces where indicated. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.

3.4 INSTALLATION

- A. Unroll sheet floor coverings and allow them to stabilize before cutting and fitting.
- B. Lay out sheet floor coverings as follows:
 1. Maintain uniformity of floor covering direction.
 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.

3. Match edges of floor coverings for color shading at seams.
4. Avoid cross seams.
5. Eliminate deformations that result from hanging method used during drying process (stove bar marks).

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.
- B. Perform the following operations immediately after completing floor covering installation:
 1. Remove adhesive and other blemishes from exposed surfaces.
 2. Sweep and vacuum surfaces thoroughly.
 3. Damp-mop surfaces to remove marks and soil.
 - a. Do not wash floor coverings until after time period recommended by manufacturer.
- C. Floor Sealer: Remove soil, visible adhesive, and surface blemishes from floor coverings before applying sealer.
 1. Apply two coats.
- D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor coverings before applying liquid floor polish.
 1. Apply four coats.
- E. After allowing drying room film (yellow film caused by linseed oil oxidation) to disappear, cover floor coverings until Substantial Completion.
- F. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 1. Do not move heavy and sharp objects directly over floor coverings. Place plywood or hardboard panels over floor coverings and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 096516

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Resinous flooring systems including cove base and trim.
 - 2. Preparation of substrate as recommended by resinous flooring manufacturer.
- B. Related Sections include the following:
 - 1. Division 01 Section "Equilibrium of Relative Humidity of Concrete Testing" for concrete slab testing procedures.
 - 2. Division 01 Section "Sustainability Requirements."
 - 3. Division 03 Section "Cast-In-Place Concrete."
 - 4. Division 09 Section "Prefabricated Curbs" for flooring termination at refrigerated walk-ins and other food service equipment.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- C. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- D. Material Certificates: For each resinous flooring component, from manufacturer.
- E. Material Test Reports: For each resinous flooring system, by a qualified testing agency.
- F. Sample Warranty.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.

- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Section 01 33 23 – Submittal Procedures – LEED Submittals for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.
- B. Executed warranty certificate.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this Section.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer and certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- C. Material Standard: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9001 registered quality system.
- D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Apply full-thickness mockups on 96-inch square floor area selected by Architect.
 - a. Include 96-inch length of integral cove base with inside and outside corner.
 - 2. Simulate finished lighting conditions for Architect's review of mockups.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRE-INSTALLATION CONFERENCE

- A. Arrange a conference at the job site to coordinate resinous flooring and critical finish systems, to be attended by the General Contractor, Architect/Owner's Representative and personnel involved in the actual manufacture as well as the installation of the Work in this Section and of the following Sections:
 - 1. Division 03 Section "Cast-In-Place Concrete."
 - 2. Division 06 Section "Architectural Casework."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
 - 1. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors.
 - 2. No on site weighing or volumetric measurements allowed
- B. Material shall be stored in a dry, enclosed area protected from exposure to moisture.
 - 1. Temperature of storage area shall be maintained between 60 and 85-degrees F.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

1.10 WARRANTY

- A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of one (1) full year from date of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing according to ASTM D 635.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.
- B. Basis of Design Products: The resinous flooring design is based on Stonclad UT Light Texture, total minimum thickness of ¼ inch as manufactured and installed by Stonhard, 253-259-4308. Manufacturer representative is Mike Aguilar magular@stonhard.com.
- C. Equivalent products by one of the following manufacturers will be considered upon prior approval of a substitution request made in compliance with Division 01 Section “Product Substitutions and Options.” Substitution requests must be accompanied by sufficient detailed documentation to allow the Architect to make a determination that the proposed product provides an equivalent system to the Basis-of-Design product.
 1. Duraflex, 877-251-5418, www.dur-a-flex.com
 2. Tufco, 800-364-0836, www.tufcoflooring.com
 3. High Performance Systems, 800-928-7220, www.highperformancesystems.com

2.3 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
- B. System Characteristics:
 1. Color and Pattern: As indicated in drawings.
 2. Wearing Surface: As indicated in drawings.
 3. Overall System Thickness: Minimum ¼ inch.
 4. Federal Agency Approvals: FDA approved for food-processing environments.
- C. System Components: Manufacturer’s standard components that are compatible with each other and are as follows:
 1. Urethane Mortar: Liquid-rich, self-priming, textured, four component, polyurethane mortar system consisting of a urethane-urea binder, pigments and graded quartz aggregates.
 - a. Application Method: Notched Trowel.
 - b. Application Thickness: ¼ inch.
 2. Finish Sealer: Two-component, pigmented, solvent-free, polyurethane coating.
 - a. Application Method: Squeegee and medium nap roller.
 - b. Application Thickness: 5-10 mils to achieve light texture.

3. Expansion/Isolation Joint Sealer Materials: Two-component, pourable polyurethane sealant with a minimum 400% percent elongation per ASTM D-638 and a Shore A Hardness of 50 per ASTM D2240.
 - a. Backer Rod: Polyurethane foam rod or polyethylene backer rod one grade larger than the joint width.
4. Dynamic Cracks, Control and Construction Joints (if needed): Two-component, flexibilized epoxy membrane in conjunction with 10 ounce fiberglass engineering fabric.
5. Integral Cove Base: Four-component, urethane mortar with two-component finish sealer applied to the height indicated on Drawings and Finish Schedule.
 - a. Radius at floor/wall interface shall be at a $\frac{3}{4}$ " minimum.
 - b. Metal Cove Termination Strip: $\frac{1}{8}$ " x $\frac{1}{2}$ ", "L" shaped, zinc or equivalent metal, cove strip fastened to wall substrate at cove height indicated on Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Moisture Testing: Test horizontal substrates to determine acceptable dryness. Test method as recommended by resinous flooring manufacturer.
 1. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 2. Perform anhydrous calcium chloride test, ASTM F1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 6 lbs per 1,000 sq. ft. per 24 hours.
 3. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

3.2 MIXING

- A. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
 1. Mix components only in amounts that can be applied within recommended application life.
 2. Discard materials not used within application life.

3.3 APPLICATION

- A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 3. Apply uninterrupted except at divider strips, sawn joints, or other types of joints indicated or required.
 4. Uniformly spread mortar over substrate using manufacturer's specialty designed screed applicator. Use notched finishing trowels and spiked rollers to smooth the material to the required thickness. Broadcast texture aggregate into the wet mortar after achieving required thickness.
- B. Finish Sealer: Sweep and vacuum off unbonded aggregate. Mix and apply finish sealer with strict adherence to manufacturer's installation procedures to both floor and coved base surfaces.
- C. Integral Cove Base: Apply cove base mix to wall surfaces in conjunction with resinous flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
- D. Expansion and Isolation Joints: Mix and apply sealant to properly prepared cut joints (if any). The use of a polyethylene backer rod should be used in expansion and/or isolation joints. Sealant shall be applied at a depth of half the width of the joint.
- E. Dynamic Crack, Control, and/or Construction Joints: Prior to installation of Resinous Flooring, mechanically rout cracks and joints to a depth of 3/8" minimum and at a 45 degree angle to create a "V" into the concrete substrate following the crack and/or joint. Apply manufacturer's recommended filler at a 30 mil thickness six inches on each side of crack or joint and filling the V. Immediately place 10 ounce woven fiberglass engineering fabric into uncured filler and saturate with additional filler applied with a medium nap roller.

3.4 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.5 PROTECTION OF ADJACENT WORK

- A. General: Resinous floor system will be installed in locations where other adjacent finish materials, including ornamental metal, lath and plaster, and other finish assemblies may already be in place. Protect all adjacent surfaces during installation and finishing.
 - 1. Installed adjacent finishes shall be completely isolated from epoxy coating system installation. Provide Plastic ("Visqueen") wrap and mask all edges.
 - 2. Provide constant supervision and immediate clean up throughout resinous floor system installation.
 - 3. After resinous floor system has fully cured, remove protection from adjacent surfaces and wipe down surfaces using clean, cotton towels.

3.6 CURING, PROTECTION AND CLEANING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process
 - 1. Close area of application for a minimum of 24 hours.
- B. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION 096723

SECTION 096750 PREFABRICATED CURBS

PART 1 - PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY:

- A. This section includes hygienic prefabricated polymer composite curbs.

1.3 RELATED WORK:

- A. Division 09 Section "Resinous Flooring" for coordination of flooring edge with prefabricated curbs.
- B. Division 11 Section "Food Service Equipment"

1.4 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Manufacturer with a minimum of three (3) years' experience in providing items of type specified.
 - 1. Obtain wall and door protection from single manufacturer.
- B. Installer's Qualifications: Installers are to have a minimum of three (3) years' experience in the installation of units required for this project.

1.5 SUBMITTALS:

- A. Shop Drawings: Show design and installation details.
- B. Manufacturer's Literature and Data: For each type of product indicated.
- C. Samples for Verification: For each type of prefabricated curb indicated, full height, 6 inches long.
- D. Manufacturer's qualifications.
- E. Installer's qualifications.
- F. Manufacturer's warranty.

1.6 DELIVERY AND STORAGE:

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer.

- B. Protect from damage from handling and construction operations before, during and after installation.
- C. Store in a dry environment of approximately 70 degrees F for at least 48 hours prior to installation.

1.7 WARRANTY

- A. Manufacturer Warranty: Manufacturer shall warranty their wall and door protection for a minimum of five (5) years from date of installation and final acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: Polymer Curbs as manufactured by PolySto Hygienic Curbs and represented by Stonhard, 253-259-4308. Manufacturer representative is Mike Agular magular@stonhard.com.
- B. Alternate manufacturers and products of equivalent design and quality will be considered via substitution request per Division 01 Section "Product Substitution Options."

2.2 PREFABRICATED CURBS - GENERAL

- A. Product Description: full core homogeneous polyester-quartz polymer curbs that offer food safety and waterproofing in heavy duty conditions. Curbs should be designed with beveled top edge to aid the run off of water and cleaning products and with a curved or sloped coving to the floor to avoid build-up of dirt. Curbs should be finished with a smooth, non-porous and easy to clean surface. Joints between the curbs and wall should always be sealed with a curved food grade silicon seal or two-component PU sealant in such a way that water runs off.
- B. Curb Configurations:
 - 1. Coved: OP20F, OP30F, IP40F.
 - 2. Straight: IP40R.
 - 3. Recessed to receive seamless cove: OP20RB, OP30RB, IP40RB

2.3 WALL BASE PROTECTION CURBS

- A. Prefabricated polymer composite curbs, HACCP compliant. PolySto Systems:
 - 1. Coved:
 - a. OP20F: 7.87" Height, 1.18" thick, 1.97" thick at base of cove.
 - b. OP30F: 11.81" Height, 2.36" thick, 2.95" thick at base of cove.
 - c. IP40F: 15.75" Height, 3.94" thick, 4.53" thick at base of cove.
 - 2. Straight:

- a. IP40R: 15.75" Height, 3.94" thick
- 3. Recessed to receive seamless cove base
 - a. OP20RB: 7.87" Height, 1.18" thick, 2.36"H x .39" depth reveal.
 - b. OP30RB: 11.81" Height, 2.36" thick, 2.36"H x .39" depth reveal.
 - c. OP40RB: 15.75" Height, 3.94" thick, 1.97"H x .39" depth reveal.

2.4 ACCESSORY MATERIALS:

- A. Internal and External corner pieces per drawings and as required.
- B. Door end pieces per drawings and as required.
- C. Wall strip protection PolySto PE500 per drawings and as required.
- D. Food safe single component sealants, PolySto Food Safe Sealant.
- E. Food safe two-component chemical weld sealant, PolySto Hygiseal.
- F. Hard Fixed Glues, PolySto Hard fixed hybrid polymer adhesive.
- G. Adhesive, PolySto Chemfix 2-component epoxy adhesive to anchor curbs.
- H. Maintenance Cleaner: PolySto Sanicoat.
- I. In heavy-duty areas, curbs should be anchored into the structural floor slab.

PART 3 - INSTALLATION

3.1 Hygienic Wall Curbs:

- A. Install PolySto curbs on walls in accordance with manufacturer's instructions.
- B. Utilize proper sealants per manufacturer's instructions.

3.2 Schedule: Provide prefabricated curbs at walls of refrigerated walk-ins and other food service equipment where Division 09 Section "Resinous Flooring" is scheduled.

3.3 Cleaning and Protection:

- A. Protect curb materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. Clean curbs after protection is removed per manufacturer's recommendations.

END OF SECTION 096750

SECTION 097710 - PLASTIC WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes:
 - 1. Homogenous Semi-rigid Polyvinyl Chloride (PVC) wall panels.
 - 2. Fiberglass Reinforced (FRP) Wall Panels
- B. Related Sections:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 10 Section "Door and Wall Protection" for stainless steel wall panels.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility for Wall Panels: Obtain each color, class and finish of panel from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Installer Qualifications: Engage an experienced Installer who has a minimum of five years experience and has successfully completed installations similar in material, design, and extent to that indicated for Project. Provide proof of experience if required by Architect.

1.4 SUBMITTALS

- A. Manufacturer's literature describing product and detailing installation methods.
- B. Shop drawings indicating the location of each panel and joining method.
- C. Sample of panel no smaller than 6 inches by 8 inches along with each accessory item including pre-formed corners and joint strips.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.

- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Cut sheets or letters from product manufacturers indicating that gypsum board, acoustic ceiling systems, wall base, wall covering products comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products

1.6 PRODUCT HANDLING

- A. All materials shall be inspected immediately upon delivery and defects reported. Remove panels from shipping skid and restack on a solid, flat, dry surface. Do not stack on fresh concrete floors or other surfaces that may emit moisture. Lay panels flat. Do not store on edge. Panels should be acclimated at least 24 hours in temperature and humidity conditions approximating the operating environment of the finished room. Damaged or deteriorated materials shall be removed from the premises.

PART 2 - PRODUCTS

2.1 REQUIREMENTS

- A. All gypsum board, acoustic ceiling systems, wall base, wall covering products used at the project shall comply with the requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda (Section 01350). The following product certifications indicate compliance with the standard: FloorScore, Greenguard Children & Schools, SCS Indoor Advantage Gold, and California High Performance School low-emitting products.

2.2 PVC WALL PANELS

- A. Basis of Design Product: The design for PVC wall panel covering is based on Altro "Whiterock." Subject to compliance with requirements, provide the named product or another product that has been approved prior to bid.
 - 1. Fire Rating per ASTM E 84: Class A.
 - 2. Finish: Smooth.
 - 3. Thickness: 0.10 inches.
 - 4. Impact Resistance: ASTM D5420: Exceeds 160 inch lbs.
 - 5. Water Absorption: ISO 62: 24 hours-0.030%; 168 hours-0.093%; 216 hours-0.106%.
 - 6. Sizes: 100 x 98 inches or 118 x 124 inches.

- B. Seams: All panel edges and all inside and outside corners shall be heat welded using manufacturer's vinyl welding rods, sealant and tools.
- C. Accessories: Vinyl Welding Rod: Altro weld rod – WSR to match panel color.
- D. Adhesives: Use only high quality construction grade polyurethane adhesives – AltroFix W39, a two-part resin-based polyurethane adhesive as recommended by manufacturer.

2.3 FRP WALL PANELS

- A. Basis of Design Product: The design for FRP wall panel covering is based on Panolam Classic Collection FRP. Subject to compliance with requirements, provide the named product or another product that has been approved prior to bid.
 - 1. Fire Rating per ASTM E 84: Class A.
 - 2. Finish: Smooth.
 - 3. Thickness: 0.09 inches.
 - 4. Barcol Hardness: ASTM D2583:35 typical.
 - 5. Water Absorption: ASTM D570: 0.2 percent typical.
 - 6. Sizes: 48 inches by 120 inches.
- B. Accessories: Color matched dividers, outside corners, inside corners, end caps and fastening rivets.
- C. Adhesive: As recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Install products in strict accordance with manufacturer's instructions and approved submittals.

3.2 INSTALLATION PVC WALL PANELS

- A. Wall Preparation: All surfaces must be free from dust and cleaned prior to installation. The working environment must also be dust free. Failure to comply with these conditions will reduce the bond strength between the adhesive and substrate, and may cause the panels to debond.
 - 1. Very absorbent / porous substrates (particularly plaster finishes and unprimed sheetrock) must have a proprietary sealer e.g. PVA primer or similar, applied to the surface a minimum of 12 hours prior to the installation.
 - 2. All electrical switches, power points etc., should be in a first fix / installation state. All electrical equipment should only be moved or altered by a qualified electrician.

3. All plumbing should have pipe-work removed to a first fix or installation state and “tails” left protruding from the substrate. Panels can then be drilled and slid over the pipe tails. All holes should be drilled 1/8” (3mm) oversize to allow for expansion, then sealed with manufacturer’s recommended Sanitary Sealant.
4. Hot pipes and steam pipes should be insulated and a 1/8” to 1/4” (3-6mm) expansion gap should be created when installing panels around these pipes, then sealed with manufacturer’s recommended Sanitary Sealant.
5. All pipes, fixing bolts, etc. extending through the panels should have a minimum 1/8” (3mm) expansion gap and be sealed using manufacturer’s recommended Sanitary Sealant.
6. If fitting to door frames, these must be in place prior to installation of panels.
7. Prior to installation, it is advisable to complete any painting which comes in contact with the panels, as sealant used at junctions is non-paintable.
8. Panels should be stored flat and be pre-conditioned a minimum of 24 hours in ambient temperatures similar to the prevailing operational conditions.
9. The panels must be stored on a level flat surface off the ground (risk of condensation on the panels if stored on damp surfaces). Storage on uneven surfaces could cause the panels to distort prior to installation.
10. First, check the rooms using a 6’ (2 m) level to ensure all walls are flat, paying particular attention to the corners, window reveals, and door entrances. These need to be inspected to ensure they are free of any debris or irregularities, which could prevent the panels laying flat to the substrate after the adhesive has been applied and the panel installed.

3.3 INSTALLATION PVC PANELS

- A. Install panels in accordance with the current published manufacturer’s Installation Guide. All joints should be joined by approved methods as detailed in the installation guide.

3.4 CLEANING PVC PANELS

- A. Panels can be cleaned with a diluted soap/detergent solution, subject to manufacturer approval.
- B. When cleaning the panel surface, the temperature of water should not exceed 140° F.
- C. Pressure cleaning with hot water may be used with the pressure nozzle a minimum of 2 feet away from the surface.
- D. To reduce the buildup of static, cleaning the panels with an anti-static solution is recommended.
- E. Stubborn stains use manufacturer’s recommended cleaner or equivalent alkaline cleaner.

3.5 INSTALLATION FRP PANELS

- A. Clean substrate of dirt, dust, waxes, and other bond breaking substances prior to beginning installation.
- B. Install panels with bottom edge located to clear top of resilient base.

- C. Apply adhesive uniformly using adhesive manufacturers recommended trowel to the entire back of panels completely to the edge (100% coverage).
- D. Lay FRP panels in place leaving approximately 1/8 inch between panels and 1/4 inch space top and bottom.
- E. Follow adhesive manufacturer's recommendations for set and application times.
- F. Apply pressure to entire panel face with laminate type roller, removing trapped air and ensure proper adhesion between surfaces.

3.6 ADJUSTING AND CLEANING FRP PANELS

- A. Replace installations out of plumb and not aligned with adjacent panels and construction.
- B. Clean panel face to remove soiling, stains, dust, and dirt using clean rags, and cleaning agents as instructed by manufacturer.
- C. Leave installation clean, free of residue and debris resulting from work of this Section.

END OF SECTION 097710

SECTION 099100 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified.
- B. Work includes painting and finishing of all interior and exterior exposed items of new surfaces except for pre-finished surfaces.
- C. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
- D. Except in Service and Storage Areas, work of this section includes field painting of all interior exposed mechanical and electrical items as listed, but not limited to the following:
 - 1. Sheet metal.
 - 2. Pipe and covered pipe.
 - 3. Ductwork.
 - 4. Grilles.
 - 5. Vents.
 - 6. Valves.
 - 7. Plastic.
 - 8. Electrical panels and doors.
 - 9. Face panels.
 - 10. Boxes.
 - 11. Conduit.
 - 12. Wire mold and fittings.
 - 13. Wire chases.
 - 14. Hangers.
 - 15. Other mechanical and electrical items are to receive finishes as specified in Divisions 21 through 28.
- E. “Paint” as used herein means all coating systems materials, including pre-treatments, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- F. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designed in “schedules.” Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these colors.

- G. Following categories of work are not included as part of field-applied finish work.
1. Pre-Finished Items: Unless otherwise indicated do not include painting when factory-finishing or installer-finishing is specified for such items (but not limited to) as follows:
 - a. Toilet enclosures.
 - b. Prefinished partition systems.
 - c. Acoustic materials.
 - d. Architectural woodwork and casework.
 - e. Finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
 2. Concealed Surfaces: Unless otherwise indicated, painting is not required on such surfaces as follows:
 - a. Walls or ceilings in concealed areas and generally inaccessible areas.
 - b. Foundation spaces.
 - c. Furred areas.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
 - g. Elevator shafts.
 3. Finished metal surfaces unless otherwise indicated:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper.
 - e. Bronze.
 - f. Similar finished materials.
 4. Operating Parts Unless Otherwise Indicated:
 - a. Mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts.
- H. Following categories of work are included under other sections of these specifications:
1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, steel doors and frames and similar items.
 2. Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework and shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.
- I. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

- J. Sprinkler Piping: Contractor shall include in his bid painting of all exposed sprinkler piping, hangers and brackets. It is the Contractor's responsibility to verify the extent of exposed sprinkler piping.
- K. Related Sections include the following:
 - 1. Division 07 Section "Water Repellants and AntiGraffiti Coatings" for Water Repellent and Antigrffiti Treatment applied to masonry.
- L. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 REFERENCES: CODES, STANDARDS AND PRACTICES

- A. General: Master Painters Institute (MPI), as distributed by the Master Painters & Decorators Association, 4090 Graveley Street, Burnaby, B.C. V5C3T6. Telephone 1-604-298-3875. Email, info@paintinfo.com.
 - 1. MPI Architectural Painting Specification Manual is used in this specification. The manual is also used as a reference for material quality and workmanship. Where there are conflicts, the more stringent shall apply.
- B. Steel Structures Painting Council (SSPC)
 - 1. SSPC-SP 1 Solvent Cleaning
 - 2. SSPC-SP 2 Hand Tool Cleaning
 - 3. SSPC-SP 3 Power Tool Cleaning
- C. The latest issues, revisions, amendments or modifications of the above referenced material in effect on the date of the Advertisement for Bids shall govern unless otherwise specified.

1.4 DEFINITIONS

- A. Materials used shall not contain more than .06 percent lead by weight.
- B. The work "provide" as used in this section, shall mean "furnish and install or apply complete in place."
- C. The term "APSM" as used in this section refers to the Master Painters Institute "Architectural Painting Specification manual."

1.5 CONTRACTOR WARRANTIES

- A. Contractor Warranty: The Contractor shall fully warrant and guarantee the work of this section against failure or non-performance for two years from the date of substantial completion. Failure or non-performance shall be corrected promptly upon discovery by the Owner. Correction work will follow project specifications.
- B. Warranty not applicable for failure of substrates, or work by others.

- C. Work in this section may be observed and tested by an independent testing and inspection agency selected by the Owner. The Owner pays the fees. Notify the agency at least 10 working days before starting work under this section. Allow full access to the work. Give full cooperation at all times to the inspector in the performance of their duties or observing and testing the work.
 - 1. The inspector will make all tests necessary of the surfaces requiring preparation, sealant, painting and finishing to determine compliance with the contract documents. The Contractor is to give the inspector 24- hour notice when the Contractor will not be on site and before restarting work. The Contractor will furnish and pay for equipment and personnel necessary for accessing surfaces for observation and testing. Coordinate with the inspector.
 - 2. Regardless of the number or frequency of observations by the inspector, the Contractor is fully responsible for quality control and compliance with plans and the contract documents.
 - 3. The Contractor is to repair all test areas that are the result of destructive testing.
 - 4. Specialist means an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field) with adequate resources to meet the schedule requirements of the project. This individual or firm must be regularly engaged in and maintain a regular force of workmen skilled in performing required work.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.
- C. Qualifications of Painters: Use only qualified journeyman painters for the surface preparation, mixing and application of paint on exposed surfaces; in the acceptance or rejection of installed painting, no allowance will be made for lack of skill on the part of painters.
- D. During preparation and painting, a foreperson will be on site to monitor the work. The foreman will be responsible for quality control for the painting Contractor.
- E. Where there is conflict with any requirements of these plans and specifications, the more stringent shall apply.
- F. A pre-work meeting will be held prior to starting work. Parties involved will be the painting Subcontractor including foreman, Contractor, Architect, and inspection agency.

1.7 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information for products to be used on the project.

- B. Samples: Prior to beginning work, Architect will furnish color selections for surfaces to be painted. Submit samples for Architect's review of color, gloss, and texture only on 8-1/2" x 11" hardboard, provide sample of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.

1.8 LEED SUBMITTALS

- A. Complete the LEED VOC Submittal Form as provided in section 013323 – Submittal Procedures – LEED Submittals for products in this section.
- B. B. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.

1.9 DELIVERY AND STORAGE

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
 - 1. Name or title of material.
 - 2. Fed. Spec. number, if applicable.
 - 3. Manufacturer's stock number and date of manufacturer.
 - 4. Manufacturer's name.
 - 5. Contents by volume, for major pigment and vehicle constituents.
 - 6. Thinning instructions.
 - 7. Application instructions.
 - 8. Color name and number.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.10 JOB CONDITIONS

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F, unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F and 95 deg F, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by paint manufacturer's printed instructions.

- D. Painting may be continued during inclement weather to meet the schedule if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- E. Moisture content of exterior wood shall not exceed 15% and interior wood shall not exceed 8%.
- F. Moisture content of concrete, GWB, cement stucco, cement board, concrete block, and brick and mortar shall not exceed 5%, unless the manufacturer permits higher moisture content.
- G. Ph shall not be below 6.5 or exceed 9 unless manufacturer permits other ranges.
- H. Provide a minimum of 40-candle power of light on surfaces while preparation and painting are underway.

1.11 EXTRA STOCK

- A. Provide Owner one gallon of each major paint color and type.
- B. List manufacturer, product, color name and number, gloss level, and where paint was applied.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Paint products manufactured or supplied by the following manufacturer are the basis-of-design products: Subject to compliance with requirements, provide products from the following manufacturer:
 - 1. Sherwin-Williams Company (The).
 - 2. Benjamin Moore.
 - 3. Rodda (*Addendum 3*)
- B. Alternate Manufacturers: Products other than the basis-of-design products may be used upon approval of pre-bid substitution request. Approval criteria include, but are not limited to, aesthetic acceptability as determined by the Architect, and whether use of a product other than basis-of-design product will result in revisions to other components of the Work.

2.2 INTERIOR PAINT

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Flat Paints, Coatings and Primers: VOC content of not more than 50 g/L.
 2. Nonflat Paints, Coatings and Primers: VOC content of not more than 150 g/L.
 3. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 4. Floor Coatings: VOC content of not more than 100 g/L.
 5. Shellacs, Clear: VOC content of not more than 730 g/L.
 6. Shellacs, Pigmented: VOC content of not more than 550 g/L.
 7. Dry-Fog Coatings: VOC content of not more than 400 g/L.
 8. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
 9. Pretreatment Wash Primers: VOC content of not more than 420 g/L.
- C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Restricted Components: Paints and coatings shall not contain any of the following.
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphtalene.
 - w. Toluene (methylbenzene).

- x. 1,1,1-trichloroethane.
- y. Vinyl chloride.

2.3 MATERIALS

- A. Unless otherwise indicated, furnish scheduled products in accordance with the referenced Manual, including paint, varnish, stain, enamel, lacquer, fillers, primers, pre-treatments, and related products for prime, intermediate, and finish coats.
- B. Material Quality: Provide manufacturer's best-quality sundry product as needed.
 - 1. Proprietary Names: Use of manufacturer's proprietary paint and sundry product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Primers for ferrous metal are to be solvent born rust inhibitive primers.
- D. Masonry and Concrete Coatings: See Division 07 Section "Water Repellants and AntiGraffiti Coatings" for Water Repellent and Antigrffiti Treatment applied to concrete and masonry."
- E. Color Pigments: Pure, non-fading, applicable types to suite substrates and service indicated.
- F. Prepare and apply material as printed by the manufacturer for mileage, handling, and application, and condition requirements.

2.4 PRIMING (Addendum 3)

- A. *Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:*
 - 1. *SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."*
- B. *Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.*
 - 1. *Stripe paint corners, crevices, bolts, welds, and sharp edges.*
 - 2. *Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.*

PART 3 - EXECUTION

3.1 INSPECTION

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely

completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.

- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area. Do not paint over dirt, rust, scale, grease, mortar droppings, cement slurry, foreign material, moisture, or scuffed surfaces.
- C. Follow surface preparation requirements of these specifications, and referenced manuals.

3.2 SURFACE PREPARATION

- A. General: Perform preparation and cleaning procedures in accordance with the referenced manual including the guide specifications and as herein specified, for each particular substrate condition. Where there is conflict, the more stringent will apply.
 - 1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others, or coatings on existing surfaces to be repainted.
 - 2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items. Clean surfaces to be painted before applying paint or surface treatments. After completion of painting operations in each space of area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates. Remove dust, weld smoke, oil, rust, dirt, mortar droppings, concrete slurry, foreign material and grease.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to these specifications, and the APSM instructions for each particular substrates exposure.
 - 1. Sand surfaces or substrates and between coats to achieve a smooth finish.
 - 2. Fill nicks, gouges, dents, joints, holes, tool marks and cracks in substrates.
 - 3. Provide barrier coats over incompatible primers.
 - 4. Install sealant at hollow metal prior to the finish coat application.
 - 5. Dull glossy surfaces prior to priming or painting.
- D. Cementitious Materials: Prepare concrete, concrete masonry units surfaces to be painted.
 - 1. Have mason remove excess mortar and fill bug holes and cracks before starting painting work.
 - 2. Remove residual efflorescence after masonry cleaning, chalk, dust, dirt, grease, marks, cement splatter, concrete slurry, loose material, oils and release agents.

- Roughen as required to remove glaze by acid etch or power tool cleaning. Provide a surface profile of 2 or more mils.
3. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application.
 4. Clean concrete floors to be painted with a solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting. Achieve a surface profile of 2 or more mils.
- E. Wood: Clean surfaces of dirt, oil, marks and other foreign substances with scrapers, mineral spirits and sand paper. Sand surfaces to ease edges, smooth wood bruises and splinters, and sharp corners exposed to view.
1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of whit shellac or other recommended knot sealer before applying primer.
 2. After priming, fill holes, cracks, dents and splits in finish surfaces with putty or plastic wood filler.
 3. Wood substrates to be stained or receive clear finishes are to be puttied with colored putty to match the wood grain. Sand smooth after each coat.
 4. Prime, stain and seal, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides and backsides of wood, and paneling.
 5. When transparent finish is required, backprime with spar varnish.
 6. Back prime paneling on interior partitions where concrete, masonry, plaster, or other wet wall construction occurs on backside.
 7. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
- F. Ferrous Metals: Clean ferrous-metal surfaces that have not been shop coated as required by SSPC-SP-3, to remove rust, dirt, weld smoke, weld spatter, factory treatments, loose material and scale, and other foreign material. Treat welded areas with phosphoric acid.
1. Primed Ferrous Metals: Power tool clean to meet SSPC-SP-3, to remove rust, weld spatter, weld smoke, dirt, foreign material, and loose and peeling paint. Treat welded areas with phosphoric acid. Touch up bare areas with the same generic primer. Sand smooth.
 2. Trusses, beams, and ceiling decking are to be cleaned by others. Provide minor surface preparation and priming. Remove dust before painting.
 3. Galvanized Surfaces including ducts and metal floor/roof decking: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil, white rust, weld smoke and other surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods. Prime exterior surfaces with Sherwin Williams's Galvite and interior surfaces with Opti-Bond or equal.
- G. Touch up bare and prepared areas and shop-applied prime coats that have been damaged. Touch up material shall be the same as the shop primer.
- H. Gypsum Wallboard: Patch minor scratches, gouges, dents, cracks and imperfections. Remove foreign material. Dust surfaces with damp rag. Prime surfaces after moisture and ph are verified.

1. Touch up primed GWB prior to finish application.

I. PVC: Scuff sand to create a profile. Solvent clean to remove oils and foreign material.

J. MDO and MDF: Sand rough areas. Wipe to remove dust and foreign material.

3.3 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in clean conditions, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.4 APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents.

a. Provide finish coats that are compatible with prime paints used.

b. Paint systems are to be premium unless noted otherwise.

c. Apply additional coats when undercoats, stains, colors, or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

d. Paint surfaces behind movable equipment, rubber base, and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment, installed panels, cabinets, or furniture with prime coat only before final installation of equipment.

e. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

f. Paint back sides of access panels, and removable or hinges covers to match exposed surfaces.

g. Finish exterior doors on tops, bottoms and side edges same as exterior and interior faces, unless otherwise indicated. Omit first coat (primer) on metal surfaces that have been shop-primed and touch-up painted, except on hollow metal doors and frames unless otherwise indicated.

h. Paint gypsum board backing for plastic laminate and fiberglass reinforced panel wainscot.

B. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coatings to permit proper drying. Acrylics are to dry at a minimum of 4 hours. Do not recoat solvent born coatings until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated.
- D. Mechanical items to be painted include, but are not limited to the following:
1. Painting of all interior grilles to match adjacent surfaces (except in service or storage areas).
 2. All surface applied mechanical items shall be painted to match adjacent surfaces (except for service and storage areas).
 3. See Part 1 "Description of Work" for expanded list.
- E. Electrical items to be painted include, but are not limited to, the following:
1. Conduit, wire mold, and fittings, hangers, chases, where exposed in occupied areas.
 2. Faces of all electrical panels to match existing surfaces (except for service and storage areas).
 3. See Part 1 "Description of Work" for expanded list.
- F. Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others. Prime gypsum board prior to all wainscot applications, including plastic laminate and vinyl wall covering.
1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- G. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- H. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.
- I. Prime all wall locations that are to receive Vinyl Coated Fabric Wall Covering as shown in the Project Drawings and as specified in Division 09 Section "Vinyl Coated Fabric Wall Covering."

3.5 FIELD QUALITY CONTROL

- A. Cooperate and coordinate with the inspection agency during the course of the work.
- B. The Owner reserves the right to invoke the following material test procedures at any time and as often as the owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the project will be taken, identified, sealed and certified in the presence of the Contractor.
- C. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
1. Quantitative material analysis.
 2. Abrasion resistance.
 3. Apparent reflexivity.
 4. Flexibility.
 5. Washability.
 6. Absorption.
 7. Accelerated weathering.
 8. Dry opacity.
 9. Accelerated yellowness.
 10. Recoating.
 11. Skinning.
 12. Color retention.
 13. Alkali and mildew resistance.
 14. Volume solids
- D. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with the manufacturer's specifications the project specifications and specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces or replace the substrate, if on repainting with specified paint, the two coatings are incompatible.

3.6 CLEAN-UP AND PROTECTION

- A. Clean-up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
1. Upon completion of painting work clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
1. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- C. At completion of work of other trades, touch-up and restore damaged or defaced painted surfaces. Trade damage correction is to be paid for by others. Touch up is not acceptable. Paint corner to corner and top to bottom of affected area.

3.7 EXTERIOR PAINT SCHEDULE_(Systems and gloss levels are found in the MPI, APSM.)

- A. Concrete (where indicated to receive paint): Ext. 3.1K. Acrylic. Gloss Level 3.
- B. CMU, Brick and Concrete Clear Finish: Refer to Division 07 Section “Water Repellants and Anti-Graffiti Coatings.”
- C. Painted Hollow Metal: Ext. 5.1D, Alkyd. Gloss Level 5.
- D. Ferrous Metal: Ext. 5.1D, Alkyd. Gloss Level 5.
- E. Galvanized Metal: (Including underside of preformed metal roofing where exposed) Ext. 5.3B, Alkyd. Gloss Level 5.
- F. Plastic and PVC: Ext. 6.8, Acrylic. Gloss Level 3, or match surrounding painted surfaces.

3.8 INTERIOR PAINT SCHEDULE

- A. Gypsum Wallboard, Standard: INT. 9.2M, Latex, Gloss Level 3.
- B. Gypsum Wallboard, Epoxy: INT 9.2F, Gloss Level 5.
- C. Gypsum Wallboard, Marker Board Paint (MBP): Equal to Wolf Gordon “Wink” water based finish consisting of non-pigmented liquid emulsion (Part A), polymer hardener (Part B) and surface conditioner. ASTM E84, Class A rated. Apply over white painted drywall surface per manufacturer’s instructions.
- D. Wood Trim, MDF, MDO: INT 6.4R, Acrylic Enamel. Gloss Level 3.
- E. Ferrous Metal: INT 5.1E, Gloss Level 5.
- F. Hollow Metal: INT Institutional Low Odor/VOC, 5.1R, Gloss Level 5, meet Green Seal Standard & VOC Range E3 or GPS-1.
- G. Galvanized Metal: INT 5.3N, Gloss Level 5, meet Green Seal Standard & VOC Range E3 or GPS-1.
- H. Galvanized Roof Deck: INT 5.3N, Gloss Level 1, meet Green Seal Standard & VOC Range E3 or GPS-1.
- I. CMU, Clear Finish: Refer to Division 07 Section “Water Repellants and Anti-Graffiti Coatings”.

END OF SECTION 099100

SECTION 101100 – VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Markerboards.
 - 2. Tackboards.
 - 3. Glass panel marker board.
 - 4. Visual display rails.
- B. Related Sections include the following:
 - 1. Division 10 Section "Display Cases" for display cases.

1.3 DEFINITIONS

- A. Tackboard: Framed tackable surfaces.
- B. Visual Display Boards: Markerboards and tackboards.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show location of panel joints.
 - 2. Show location of special-purpose graphics for visual display surfaces.
- C. Samples for Verification: For each type of visual display surface indicated and as follows:
 - 1. Visual Display Surface: Not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
 - 2. Accessories: Full-size Sample of each type of accessory.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for surface-burning characteristics of vinyl fabrics.
- E. Maintenance Data: For visual display surfaces to include in maintenance manuals.

- F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.
- B. Store visual display units vertically with packing materials between each unit.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating visual display surfaces without field measurements. Coordinate wall construction to ensure that actual dimensions correspond to established dimensions.
 - 2. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.8 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Surfaces lose original writing and erasing qualities.
 - b. Surfaces become slick or shiny.
 - c. Surfaces exhibit crazing, cracking, or flaking.
 - 2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: ASTM A 424, enameling-grade steel, uncoated thickness indicated; with exposed face and edges coated with primer, 1.7-to-2.5-mil- thick ground coat, and color cover coat; and concealed face coated with primer and 1.7-to-2.5-mil-thick ground coat.
 - 1. Gloss-Finish Cover Coat: Gloss as indicated; dry-erase markers wipe clean with dry cloth or standard eraser. Minimum 3.0-to-4.0-mil- thick cover coat. Cover and ground coats shall be fused to steel at manufacturer's standard firing temperatures but not less than 1475 deg F.
- B. Hardboard: AHA A135.4, tempered.
- C. Particleboard: ANSI A208.1, Grade 1-M-1, made with binder containing no urea formaldehyde.
- D. Natural-Cork Sheet: MS MIL-C-15116, Type II seamless single-layer, 1/4-inch- thick, compressed fine-grain, bulletin board quality, natural-cork sheet; face sanded for natural finish.
- E. Vinyl Fabric: FS CCC-W-408, Type II, weighing not less than 20 oz./ly. (452 g/sq. m); with flame-spread index of 25 or less when tested according to ASTM E 84. Refer to Finish Schedule drawing sheet for color.
- F. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

2.2 MARKERBOARD ASSEMBLIES

- A. Porcelain-Enamel Markerboard Assembly (Fixed and Sliding): Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and 24 gauge porcelain-enamel face sheet with high-gloss finish, one piece without seams. Provide tack strip at top of marker board.
 - 1. Basis-of-Design Product: The design for each visual display surface is based upon on the product specified. Subject to compliance with requirements, provide named product or a comparable product by one of the other manufactures specified:
 - a. PolyVision, A Steelcase Company; e3 Environmental Ceramic steel markerboard.
 - 2. Acceptable Manufactures:
 - a. ADP/Lemco, Inc.
 - b. Claridge Products & Equipment, Inc.
 - c. Ghent Manufacturing Inc.
 - d. Best-Rite Manufacturing.
 - e. Polyvision, Platinum Visual Series.

3. Medium Density Fiber (MDF) Core: ½-inch thick; with 0.015-inch- thick, aluminum sheet backing.
4. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type. Sizes of fixed markerboards as indicated on Drawings as follows:
 - a. MB4: 4 feet wide, 4 feet high.
 - b. MB6: 6 feet wide, 4 feet high.
 - c. MB8: 8 feet wide, 4 feet high.
 - d. MB8x5: 8 feet wide, 5 feet high.
5. Color: Selected from manufacturer's full range.

2.3 TACKBOARD ASSEMBLIES

- A. Manufacturers or approved:
 1. ADP/Lemco, Inc.
 2. Claridge Products & Equipment, Inc.
 3. Ghent Manufacturing Inc.
 4. PolyVision Corporation.
- B. Natural Cork Tack Assembly: 1/4-inch- (6-mm-) thick, cork sheet factory laminated to 1/4-inch- (6-mm-) thick particleboard backing.
- C. Joint Accessories: Manufacturer's standard, exposed trim at butt joints.
- D. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific tack wall panels and substrate application, as recommended in writing by visual display surface manufacturer, and with a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Color: Selected by Architect from manufacturers full range.

2.4 MARKERBOARD AND TACKBOARD ACCESSORIES

- A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- (1.57-mm-) thick, extruded aluminum; of size and shape indicated.
 1. Factory-Applied Trim: Manufacturer's standard.
 2. Finish of Exposed Frame: Satin anodized.
- B. Chalktray: Manufacturer's standard, continuous.
 1. Provide at all markerboards
 2. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.
- C. Map Rail: Provide the following accessories:

1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 1 to 2 inches (25 to 50 mm) wide.
2. End Stops: Located at each end of map rail.
3. Map Hooks and Clips: Two map hooks with flexible metal clips for every 48 inches of map rail or fraction thereof.
4. Flag Holder: One for each classroom. Verify flag dowel size with Owner.

2.5 GLASS PANEL MARKER BOARD

- A. Basis-of-Design: Provide products manufactured by Clarus Glassboards LLC. 8715 Harmon Road, Fort Worth, TX 76177 (888) 813-7414:
 1. Product: Architectural Series.
 2. Color: C101, Smooth White.
 3. Core: Magnetic.
 4. Locations: As indicated on Drawings.
- B. Provide installation accessories as required for a complete installation.
- C. Provide the following loos accessories at each installed location:
 1. Magnetic Marker and Eraser Holder Box:
 - a. Size: 1-3/4 inches x 2-1/4 inches x 12 inches.
 - b. Color: F101-White.
 - c. Quantity: 2.
 2. Marker Cradle Hook:
 - a. Size: 1 inch × 1-1/4 inches.
 - b. Quantity: 8.

2.6 VISUAL DISPLAY RAILS

- A. General: Manufacturer's standard, aluminum framed, tackable visual display surface fabricated into narrow rail shape and designed for displaying material.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Bangor Cork Company, Inc.
 2. Best-Rite Manufacturing
 3. Claridge Products & Equipment, Inc.
 4. Ghent Manufacturing Inc.
 5. Platinum Visual Systems; a division of ABC School Equipment.

2.7 FABRICATION

- A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.
- B. Visual Display Boards: Factory assemble visual display boards, unless otherwise indicated.
- C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.
 - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
 - 2. Provide manufacturer's standard vertical-joint spline system between abutting sections of markerboards.
 - 3. Provide manufacturer's standard mullion trim at joints between markerboards and tackboards of combination units.
- D. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure.
 - 1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.
- E. Vertical Sliding Porcelain Enamel Markerboards: Provide vertical sliding units with all corners reinforced with angles to strengthen unit and eliminate vibration.
 - 1. Panels to be equipped with manufacturer's standard neoprene ball-bearing end rollers, four on each side of the sliding panel. Counterbalance the sliding panel with lead counterweights supported by steel aircraft cable over ball-bearing sheaves; with removable cover plate for access to counterweights. Provide rubber bumpers at top and bottom of sliding panel.
 - 2. Vertical sliding units to be completely assembled at the factory and erected on a test panel before shipping.
 - 3. All sections to be properly fitted and all units to be thoroughly tested, then taken apart for shipping. Components are to be clearly marked for easy reassembly on the job.
 - 4. Markerboard:
 - a. Back Panels:
 - i. Face Sheet: Porcelain-enamel face sheet with 0.021 inch uncoated thickness.
 - ii. Core: ½" Medium Density Fiberboard (MDF).
 - iii. Backing: Steel

2.8 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- D. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine walls and partitions for proper backing for visual display surfaces.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove dirt, scaling paint, projections, and depressions that will affect smooth, finished surfaces of visual display boards.
- B. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display boards and surfaces.

3.3 INSTALLATION, GENERAL

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY UNITS

- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches (400 mm) o.c. Secure both top and bottom of boards to walls.
 - 1. Attach chalktrays to boards with fasteners at not more than 12 inches (300 mm) o.c.

3.5 CLEANING AND PROTECTION

- A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 101100

SECTION 101400 - IDENTIFYING DEVICES

PART 1 - GENERAL

1.1 GENERAL

- A. Comply with general provisions of the Contract, including General, Supplementary, and other Conditions, and with Division 1 General Requirements sections.

1.2 SUMMARY

- A. Work includes:
 - 1. Occupancy limitations.
 - 2. Accessibility signs.
 - 3. Exterior building signs.
- B. Related Sections include the following:
 - 1. Division 22 Section "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
 - 2. Division 26 Sections for electrical service and connections for illuminated signs.
 - 3. Division 26 Section "Identification" for labels, tags, and nameplates for electrical equipment.
 - 4. Division 26 Section "Interior Lighting" for illuminated Exit signs.

1.3 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
 - 1. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:
 - 1. Acrylic sheet.
 - 2. Die-cut vinyl characters and graphic symbols.
- D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Panel Signs: Not less than 7 inches square. Approved sample may be incorporated into the project.

E. Sign Schedule: Use same designations indicated on Drawings.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.6 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

2.2 PANEL SIGNS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. APCO Graphics, Inc.
2. Best Sign Systems Inc.

- B. Interior Room Number Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner. Surround sign with anodized aluminum frame anchored to the wall with tamper proof screws. Hold sign in frame with set screws in top and bottom on both sides of frame. Comply with the following requirements:

1. Acrylic Sheet: 0.060 inch thick.
2. Edge Condition: Square cut.
3. Corner Condition: Rounded to radius indicated.
4. Mounting: Framed.

- a. Wall.
- b. Spanner head anchors for substrates encountered.

5. Color: As selected by Architect from manufacturer's full range.

- a. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surface with contrasting colors.
- b. Provide slot on both side of metal trim at blind inserts.

6. *Size: As indicated in drawings (Addendum 2)*

C. Permanent Function Signs:

1. ~~8-1/2 inches by 3 inches with~~ (Addendum 2) 1/32 inch raised copy and embossed Grade 2 Braille on 1/8 inch Plexiglas separated from a backing piece of 1/16 inch Plexiglas spaced with 1/32 inch spacer. Sign shall identify room name and number. Surround sign with anodized aluminum frame anchored to the wall with tamperproof screws. Provide backer sign at locations where attached to glazing. Hold sign in frame with setscrews in top and bottom of both sides of frame. Install frame to the latch side of the door, 60 inches from the centerline of the sign to the floor. See drawings for layout.
2. ~~Provide one (1) at the kitchen, changing room, and storage room.~~ *Size: As indicated in drawings. (Addendum 2)*

D. Toilet Room/Handicapped Symbol Signs:

1. Modulex-Interior 30 or approved.
2. Comply with code requirements for size, symbol and colors.
3. ~~Size approximately 8 inches by 8 inches.~~ *Size: As indicated on drawings (Addendum 2)*
4. Provide signs at all toilet facilities.

E. Maximum Occupancy Signs:

1. Provide plaque signs similar to room name signs - verify actual occupant load and location of sign with architect.
2. ~~Size: 6" high x 10" long~~ *Size: As indicated on drawings. (Addendum 2)*
3. Quantity (2) mounted at Architect's directions.

F. Exit Sign

1. Provide (1) 2"x3" sign stating "EXIT" at each exterior door. Typically to be mounted on a mullion adjacent the door. Architect to provide exact location.
2. *Size: As indicated on drawings. (Addendum 2)*

~~G. Engraved Plastic Laminate Type: (Addendum 2)~~

1. ~~Engraving Stock: "Norplex," Micarta" or approved, 1/8 inch plastic laminate, colors as selected.~~
2. ~~Type Face: Incised letter, helvetica medium style.~~
3. ~~Size: 5/8 inch high letters and as required to meet local codes and ordinances.~~
4. ~~Install with approved type stainless steel or brass Philips head screws as selected.~~
5. ~~Provide the following signs and locate as directed:~~
 - a. ~~"FIRE SPRINKLER MAIN VALVE" (1 at door to mechanical room)~~
 - b. ~~"ELECTRICAL ROOM" (2 total, 1 on each exterior door)~~
 - c. ~~"MECHANICAL ROOM" (1 at door to mechanical room)~~

2.3 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.4 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for three years for application intended.

2.5 ILLUMINATED ALUMINUM LETTERING

- A. Manufacturer: Sign Solutions or equivalent. Contact info www.signsolutions.us; 406-777-1004.
- B. Type Face: Optima 404; upper case.
- C. Finish: anodized aluminum or stainless steel; color as selected by Architect.
- D. Letters cast from prime 514 alloy aluminum or stainless steel.
- E. Locate as directed; install per manufacturer's recommendations for a 1-1/2 inch projected mounting.
- F. Backlit LED illumination.
- G. Provide individual letters as follows:
 - 1. "PATIENT SUPPORT CENTER" (all caps)
 - a. Height: 24 inches.
 - b. Location: As indicated on Drawings.
 - 2. "22"
 - a. Height: 24 inches.
 - b. Location: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

- B. Verify that items are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
 - 2. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102213 - WIRE MESH PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Standard-duty wire mesh partitions.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 08 Section "FinishHardware" for lock cylinders and keying.
 - 2. Division 09 Section "Painting" for field painting wire mesh partitions.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data for each type of product specified, consisting of manufacturer's specification, technical data, and installation instructions.
- B. Shop Drawings showing fabrication and installation of wire mesh partitions, including plans, elevations, and large-scale details showing anchorage and accessory items. Provide location template drawings for items supported or anchored to permanent construction.
- C. Samples of a 12-by-12-inch wire mesh panel constructed of specified frame members, wire mesh, and color charts.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing wire mesh partitions similar to those indicated for this Project and that have a record of successful in-service performance.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations for wire mesh products by accurate field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication and delivery schedules with construction progress to avoid delaying the Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee location dimensions and proceed with fabricating wire mesh products without field measurements. Coordinate wall, column, floor, and ceiling construction to ensure that actual location dimensions correspond to guaranteed dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Southwest Solutions Group Style 840. Subject to compliance with requirements, products from the following manufacturers will be considered:
 - 1. Acorn Wire and Iron Works, Inc.
 - 2. G-S Company (The).
 - 3. Hoosier Fence Co., Inc. (The).
 - 4. Indiana Wire Products, Inc.
 - 5. Kentucky Metal Products Co.
 - 6. King Wire Partitions, Inc.
 - 7. Lakeside Wire and Iron Co.
 - 8. Miller Wire Works, Inc.
 - 9. SpaceGuard Products.
 - 10. Wire and Iron Products, Inc.
 - 11. WireCrafters, Inc.

2.2 MATERIALS

- A. Steel Wire: ASTM A 853.
- B. Steel Channels, Angles, Plates, and Bars: ASTM A 36 (ASTM A 36M).
- C. Cold-Rolled Steel Channels: Formed from steel sheet.
- D. Square Steel Tubing: Cold-formed structural steel tubing, ASTM A 500.

2.3 STANDARD-DUTY MESH PARTITIONS

- A. Mesh Panels: 10 gauge steel wire crimped and woven in to 2" x 1" opening rectangular mesh, securely welded into a frame of 1 1/4" x 1 1/4" x 1/8" steel angle factory punched with slotted holes to accept mounting hardware.
- B. Posts: Made of 2" x 2" x 14-gauge steel tubing with 2" x 7" x 1/4" steel flat base plates welded to each tube. Posts are factory drilled with holes to accept mounting of mesh panels.

2.4 DOORS

- A. Sliding Doors: Constructed of the same materials as the panels with two 1/4" x 3/4" horizontal stiffeners across the width, and two vertical 1/4" x 3/4" stiffeners from center to top or bottom. Equip with two 4-wheel trolley trucks and 1 7/8" x 2 3/8" door track.
 - 1. Width: as indicated in the Project Drawings.
 - 2. Locking: Cylinder locking keyed to master key system.
 - 3. Door Latches: Provide lever handle door latch that will disengage a strike to open the partition door.

2.5 FABRICATION

- A. Do not use components less than sizes indicated. Use larger-size components as recommended by partition component manufacturer.
- B. Provide bolts, hardware, and accessories for complete installation.
- C. Finish: Manufacturer's standard, shop-applied enamel finish. Provide manufacturer's standard finish color.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

- A. Erect partitions plumb, rigid, properly aligned, and securely fastened in place, complying with Drawings and manufacturer's recommendations.
- B. Provide additional field bracing as shown or necessary for rigid, secure installation. Installer to provide additional clips and bracing as required.

3.3 ADJUSTING AND CLEANING

- A. Adjust moving components for smooth operation without binding.
- B. Touch up damaged finish after completing installation using field-applied paint to match color of shop-applied finish.

END OF SECTION 102213

SECTION 102600 WALL & DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Stainless steel wall protection system including wall panels, outside and inside corners, and edge bars.
 - 2. Heavy duty aluminum wall protection system including wall panels, outside, and base boards.
- B. Related Sections:
 - 1. Division 08 Section "Hardware" for metal armor, kick, mop, and push plates.
 - 2. Division 09 Section "Plastic Wall Panels" for PVC and FRP wall protection.
 - 3. Division 09 Section "Prefabricated Curbs" for plastic wall base curbing at food service equipment.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's current printed product literature, specifications, installation instructions, and field reports.
- B. Shop Drawings: Submit shop drawings to indicate materials, details, and accessories.
- C. Samples: Submit duplicate sample pieces of material, as well as accessory pieces.
- D. Quality Assurance Submittals: Submit the following:
 - 1. Manufacturer's Instructions: Current published manufacturer's installation and maintenance instructions.
- E. Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty: Warranty documents specified herein.

1.4 QUALITY ASSURANCE

- A. Obtain all components of wall protection system from a single manufacturer.
- B. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- C. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE & HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Deliver, store and handle materials in accordance with Division 01 Section "Product Requirements."
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer.
- E. Store panels in temperature controlled environments.

1.6 1.09 PROJECT CONDITIONS

- A. Maintain air temperature and structural base temperature at installation area between 41F (5C) and 80F (26C) for 48 hours before, during and 24 hours after installation.

1.7 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: ProTek Systems, Inc., 800-598-2153, www.proteksystem.com.
- B. Alternate manufacturers and products of equivalent design and quality will be considered via substitution request per Division 01 Section "Product Substitution Options."

2.2 STAINLESS STEEL WALL COVERINGS

- A. Basis of Design: WPS-12 stainless steel wall system as manufactured by ProTek.
- B. Stainless Steel Wall Covering Panels:
 - 1. Material: Type 304 #4 satin stainless steel sheet. Consult factory for recommended gauge.
 - 2. Standard Sheet Sizes: 4ft x 8ft or 4ft x 10ft
 - 3. 1/2" offset construction
 - 4. Finish: #4 satin
- C. Inside Corners and Outside Corners:
 - 1. Material: Type 304 #4 satin stainless steel. Consult factory for recommended gauge.
 - 2. Standard sizes: 4ft, 8ft, or 10ft
 - 3. 1/2" offset construction
 - 4. Finish: #4 satin
- D. Edge Bar / Top Cap:
 - 1. Material: Type 304 brushed stainless steel.
 - 2. Standard sizes: 12ft
 - 3. Profile: 1" x 1/8"
 - 4. Brushed finish
- E. Mounting Method: Adhesive using manufacturer's recommended adhesive for the applicable substrate.

2.3 HEAVY DUTY ALUMINUM WALL PROTECTION

- A. Basis of Design: SD-50 Super Duty wall system as manufactured by ProTek.
- B. Wall Panels:
 - 1. Material: Alloy 5052-H32 .050" aluminum sheet coated with Super Duty polyurea.
 - 2. Stock Size: 4ft x 8ft or 4ft x 10ft
 - 3. Color: As selected by Architect from manufacturer's standard range
- C. Base Board:
 - 1. Material: Alloy 6061 extruded aluminum rectangle coated with Super Duty polyurea.
 - 2. Stock sizes: 8ft, 10ft, or 12ft
 - 3. Profile: 1/4" x 4"
 - 4. Color: Same color as wall panels.
- D. Outside Corners:

1. Material: Alloy 5052-H32 .080" aluminum coated with Super Duty polyurea.
 2. Stock sizes: 4ft, 8ft, or 10ft
 3. Wing size: 2"
 4. Color: Same color as wall panels.
- E. Mounting Method: Adhesive using manufacturer's recommended adhesive for the applicable substrate.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data and installation instructions.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

3.3 SUBSTRATE PREPARATION

- A. Walls should be smooth and level. High points must be removed and low points filled with filler intended for the substrate and environmental conditions.
- B. Surfaces must be permanently dry and free from all substances that may contribute to adhesive bond failure.
- C. Exterior walls must be adequately damp-proofed and insulated.
- D. Drywall substrates should be paint ready.

3.4 PREPARATION

- A. All surfaces must be free from dust and cleaned prior to installation. The working environment must also be dust free. Failure to comply with these conditions will reduce the bond strength between the adhesive and substrate, and may cause the panels to detach.
- B. Very absorbent / porous substrates (particularly plaster finishes and unprimed sheetrock) must have a proprietary sealer e.g. PVA primer or similar, applied to the surface a minimum of 12 hours prior to the installation.
- C. All electrical switches, power points etc., should be in a first fix / installation state. All electrical equipment should only be moved or altered by a qualified electrician.
- D. All plumbing should have pipe-work removed to a first fix or installation state and "tails" left protruding from the substrate. Panels can then be drilled and slid over the pipe tails. All holes should be drilled 1/8" oversize, then sealed with caulking.

- E. Hot pipes and steam pipes should be insulated and a 1/8" to 1/4" expansion gap should be created when installing panels around these pipes, then sealed with caulking.
- F. All pipes, fixing bolts, etc. extending through the panels should have a minimum 1/8" expansion gap and be sealed with caulking.
- G. If fitting to door frames, these must be in place prior to installation of panels.
- H. Prior to installation, it is advisable to complete any painting which comes in contact with panels, as sealant used at junctions is non-paintable.
- I. Panels should be stored flat and be pre-conditioned a minimum of 24 hours in ambient temperatures similar to the prevailing operational conditions.
- J. The panels must be stored on a level flat surface off the ground (risk of condensation on the panels if stored on damp surfaces). Storage on uneven surfaces could cause the panels to distort prior to installation.
- K. First, check the room using a 6' level to ensure all walls are flat, paying particular attention to the corners, window reveals, and door entrances. These need to be inspected to ensure they are free of any debris or irregularities, which could prevent the panels laying flat to the substrate after the adhesive has been applied and the panel installed.

3.5 INSTALLATION

- A. Stainless Steel and Aluminum Wall System Installation: Install wall systems in accordance with the current published manufacturer's Installation Guide.

3.6 CLEANING

- A. Wall panels can be cleaned with a diluted soap/detergent solution.
- B. To reduce the buildup of static, cleaning the panels with an anti-static solution is recommended.

END OF SECTION

SECTION 102813 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Extent of each type of toilet accessory is indicated on drawings.
- B. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.
- C. Accessories may be used in locations other than toilet rooms, i.e. lounges, janitor rooms, etc.
- D. The contractor shall provide solid blocking for accessories at all locations. See also Division 06 Section “Rough Carpentry.”
- E. Types of toilet accessories required include the following:
 - 1. Soap dispenser (OFCI).
 - 2. Paper towel dispenser (OFCI).
 - 3. Electric hand dryer (OFCI)
 - 4. Mirror.
 - 5. Semi-recessed toilet tissue dispenser.
 - 6. Toilet seat cover dispenser (OFCI).
 - 7. Toilet room grab bars.
 - 8. Hand sanitizer dispenser (OFCI)
 - 9. Single robe hook.
 - 10. Mop & broom holder.
 - 11. Utility shelving.
 - 12. Glove dispenser (OFCI)
 - 13. Sharps container (OFCI)
 - 14. Shower enclosure.
 - 15. Shower Curtain and Shower Rod.

1.3 DEFINITIONS

- A. “OFCI” is the abbreviation for “Owner Furnished, Contractor Installed.”

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.

2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 3. Material and finish descriptions.
 4. Features that will be included for Project.
 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
1. Identify locations using room designations indicated on Drawings.
 2. Identify products using designations indicated on Drawings.
- C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.5 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

1.6 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.7 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- C. Coordinate blocking requirements prior to installation.

1.8 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design Product Standard Accessories: The design for the toilet accessories is based on "Bobrick Washroom Equipment, Inc." Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved:
 1. Bradley Corporation.
- B. Basis of Design Product Ligature Resistant Accessories: The design for the toilet accessories is based on Whitehall Manufacturing. Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved:
 1. Kingsway Group.
- C. Basis of Design Product Shower Enclosure: The design for the shower enclosure is based on CDX Comfort Designs. Subject to compliance with requirements, provide the named product or a comparable product by one of the following or approved:
 1. Kohler

2.3 STANDARD ACCESSORIES

- A. Soap Dispenser: OFCI.
- B. Paper Towel Dispenser: OFCI
- C. Mirror: Bobrick #B-290. One-piece, roll-formed 3/4" x 3/4" (19 x 19mm) angle-frame. Type 304 stainless steel angle with satin finish. Corners heliarc welded, ground and polished smooth. Beveled frame edge at mirror. No. 1 quality, 1/4" (6mm) glass mirror with galvanized steel back. Provide with integral shelf, 5 inches deep at staff toilet rooms. See Drawings for size, or 24" x 36" typical unless noted otherwise on Drawings.
- D. Semi-Recessed Toilet Tissue Dispenser: Bobrick B-4388
- E. Toilet Seat Cover Dispenser: Bobrick B-221
- F. Toilet Room Grab Bars: Provide Bobrick Series #B-6806, or approved, Type 304 stainless steel 1-1/2" o.d. grab bars in toilet rooms, of lengths and mounting conditions as required for wall construction on which they are mounted, and of shapes and types shown on Drawings. Concealed mounting.
- G. Single Robe Hook: Bobrick #B-671. Bright polished stainless steel.
- H. Mop & Broom Holder: Bobrick #B-223 x 24. Stainless steel with satin finish. Provide one in each custodial room.
- I. Wall-Mounted Utility Shelving: Knape & Vogt Series 85/185 heavy duty shelf standards and brackets. Provide at each custodial room. Brackets 185 Series, 16 inch length. Standards 85 Series, double slot, 48 inch length, maximum spacing 16" (three minimum per 36" long shelf). 36" Width or as indicated. Shelves to be 3/4" x 16" x length indicated, plywood with white plastic laminate overlay and rounded front edge. Provide (3) shelves at each location unless otherwise indicated.
- J. Shower Enclosure: Comfort Designs Model XS1363BFSD including grab bars, fold-up seat, hand-held shower assembly with slide bar, pressure balancing mixing valve, soap dish.
- K. Shower Curtain: Bobrick #204-3. Vinyl shower curtain, opaque, matte white .008 inches thick. Nickel plated brass grommets at 6 inches o.c. Bottom and sides hemmed. 70 inches wide x 72 inches high. Include number of spring lock stainless steel wire hooks as required for grommets.
- L. Shower Curtain Rod: Bobrick #B-6047. 18 gauge Type 304 stainless steel, satin finish. 1-1/4 inches diameter 2-1/2 inches square, Type 304 stainless steel, satin finish flanges. 60" long (±); verify.

2.4 LIGATURE RESISTANT ACCESSORIES (WC Room 103 and WC Room 202)

- A. Soap Dispenser: OFCI
- B. Electric Hand Dryer: OFCI (American Specialties, Inc. Model #0198-MH)
- C. Mirror: Whitehall Model WH 1815
- D. Semi-Recessed Toilet Tissue Dispenser: Whitehall Model WH 1845B
- E. Toilet Room Grab Bars: Whitehall WH 1110

2.5 FABRICATION

- A. General: Only an unobtrusive stamped logo of manufacturer, as approved by Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by means of either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Where toilet accessories overlap upper edge of wainscot, provide plywood spacer of thickness equal to wainscot thickness. Plywood to have hardwood edge band and shall be recessed from edge of accessory 3/8" on all exposed perimeter edges.
- C. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102813

SECTION 104400 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fire extinguishers.
 - 2. Fire extinguisher cabinets.
 - 3. Fire extinguisher mounting brackets.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product data for cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain extinguishers and cabinets from one source from a single manufacturer.
- B. Coordination: Verify that cabinets are sized to accommodate type and capacity of extinguishers indicated and provided by Owner under separate Contract.
- C. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating and classification of extinguisher.
- D. FM-Listed Products: Fire extinguishers approved by Factory Mutual Research Corporation for type, rating and classification of extinguisher with FM marking.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. J.L. Industries Inc., a division of Activar Construction Products Group.
 2. Larsen's Manufacturing Co.
 3. Modern Metal Products.
 4. Potter-Roemer, LLC.
 5. Samson Products.

2.2 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, that comply with authorities having jurisdiction.
 1. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2:10 A:B, 10 lbs., nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
 2. Wet-Chemical Type: UL-rated 2-A:1-B:C:K, 2.5-gal. nominal capacity, with potassium carbonate-based chemical in stainless-steel container; with pressure-indicating gage.
- B. Mounting: Coordinate blocking locations prior to installation.
 1. Public Area Mounting: Cabinet mounted.
 2. Service Area Mounting: Metal brackets.
- C. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.
 1. Manufacturers: Subject to compliance with requirements, provide products by the same manufacturers as extinguishers.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

- a. Orientation: Vertical.

2.4 CABINETS

- A. Construction: Manufacturer's standard box, with trim, frame, door and hardware to suit cabinet type, trim style and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
 1. Typical non-rated cabinets as per this specification.
 2. Construct fire rated cabinets with double walls lined with minimum 5/8 inch thick, fire barrier material. Provide factory drilled mounting holes. Location as indicated on drawings.
- B. Cabinet Type: Suitable for containing the following:
 1. Fire extinguisher.
- C. Cabinet Mounting: Suitable for the following mounting conditions. See drawings for locations at each type:
 1. Semi-recessed: Cabinet box (tub) partially recessed in walls of shallow depth.
- D. Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.
 1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
 - a. Rolled-edge trim with 2-1/2-inch backbend depth.
 - b. Trim Metal: Of same metal and finish as door.
- E. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
 1. Materials:
 - a. Trim: Exposed.
 - b. Doors: Aluminum, clear anodized finish with brushed satin finish.
 - c. Door Style: Safety glass panel.
 - d. Finish: No. 180 Clear Anodized
- F. Identify fire extinguisher in cabinet with FIRE EXTINGUISHER lettering applied to door. Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing and location.
 1. Application Process: Silk screen.
- G. Door Style: Manufacturer's standard design.
 1. Duo Panel: Clear tempered float glass, 3/16 inch thick.

- a. Silk-screen lettering or design.

- H. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 deg.

2.5 STEEL CABINET FINISHES

- A. Surface Preparation: Solvent-clean surfaces complying with SSPS-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5 (white metal blast cleaning) or SSPC-SP 8 (pickling).
- B. Baked-Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard two-coat baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's instructions for applying and baking to achieve a minimum dry film thickness of 2.0 mils.
 1. Color and Gloss: As selected by Architect from manufacturer's full range for color and gloss. Paint the following:
 - a. Exterior of cabinet, except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Follow manufacturer's printed instructions for installation.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.
 1. Prepare recesses in walls for cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
 2. Fasten mounting brackets and cabinets to structure, square and plumb.

END OF SECTION 104400

SECTION 105120 – PHENOLIC CORE LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Phenolic core lockers to be located as indicated on the Drawings.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for concealed wood support base, furring, blocking, and shims required for installing lockers and concealed within other construction before locker installation.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show base, sloping tops, filler panels and other accessories.
 - 2. Include locker identification system.
- C. Color samples on 12 inch squares of same plastic laminate to be used for exposed surfaces of lockers.
- D. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of locker manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain lockers and accessories through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for locker installation.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify the following by field measurements before fabrication and indicate measurements on Shop Drawings:
 - 1. Concealed framing, blocking, and reinforcements that support lockers before they are enclosed.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish recessed opening dimensions and proceed with fabricating lockers without field measurements. Coordinate wall and floor construction to ensure that actual recessed opening dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that lockers can be supported and installed as indicated.

1.8 PROJECT CLOSEOUT

- A. Warranty:
 - 1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - a. Failures include, but are not limited to, the following:
 - 1) Structural failures.
 - 2) Faulty operation of latches and other door hardware.
 - b. Damage from deliberate destruction and vandalism is excluded.
 - c. Warranty Period for Phenolic Core Lockers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PHENOLIC CORE LOCKERS

- A. Manufacturer and Style:
 - 1. Basis of Design Manufacturer: ASI Storage Solutions, Traditional Plus. Subject to compliance with requirements, phenolic lockers may also be provided by one of the following manufacturers

- a. Brikley
 - b. Hollman
 - c. All Partitions
 - d. *Columbia Lockers (Addendum 1)*
- B. Locker Arrangement:
1. Provide two-tier 72" H x 12"W x 15"D.
- C. Materials: Solid phenolic cores with plastic laminate faces with multiple resin-impregnated kraft and surface sheets fused at high temperature and pressure.
1. Doors, Tops, Bottoms, Shelves and End Covers: 1/2" solid phenolic core with plastic laminate face.
 2. Side and Back Panels: 3/8" solid phenolic core with plastic laminate face.
- D. Construction: Basis of Design manufacturer's standard construction
1. Doors shall be fitted with recessed handle, number plate, padlock hasp, and optional locking device. Perimeter ventilation. Doors shall be mounted to side panel using powder coated steel piano-type hinges and machined fasteners. Door edges shall be smooth and chamfered with corners radiused.
 2. Side Panels shall be attached to all Tops, Bottoms, and Shelves, using rust-resistant and steel fasteners. Exposed edges shall be smooth and chamfered.
 3. Tops, Bottoms, and Shelves shall be attached to all Side Panels, using rust-resistant and steel fasteners. Exposed edges shall be smooth and chamfered.
- E. Hardware: Basis of Design manufacturer's standard construction
1. Doors: All hinges shall be power coated steel, 120 degree limited swing. Door latches shall be mounted at the midpoint of each door. Hasps shall be mounted below each handle and will accept standard padlock styles.
 2. Fasteners shall be of rust resistant door hinges and latches, and handles will be mounted with rivets and/or machine screws. Hooks and number plates will be mounted with rivets.
 3. End Cover Panels shall be mounted with stainless steel barrel screws.
 4. Locker units banked together to be joined with stainless steel barrel screws.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c.
 - 2. Identification Plates: Attach plates in each locker door with at least two aluminum rivets.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.
- B. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit locker use during construction.
- C. Touch up marred finishes, or replace lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

SECTION 105626 - MOBILE STORAGE SHELVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Mechanically assisted systems.
2. Powered systems.
3. Steel-bracket shelving.
4. Slab sawing and preparation for recessed rails.

B. Related Requirements:

1. Division 03 Section "Hydraulic Cement Underlayment" for leveling of floor where recessed tracks are installed.
2. Division 26 Sections for power connections.

1.3 COORDINATION

- A. Recessed Tracks: Coordinate size and location of recessed rails and structural engineer's recommendation for anchorage with approved shop drawings. Coordinate slab preparation with schedule to occur before final finishes are installed.

- B. Powered systems: Coordinate connections with electrical subcontractor.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include mobile operation, construction details, material descriptions, dimensions of individual components and profiles, and finishes for mobile storage shelving systems and accessories.

B. Shop Drawings:

1. Include plans, elevations, sections, and details.
2. Show shelving layout.
3. Show location and extent of rail system including depth required if recessed.
4. Show clear-aisle widths from face of carriages.

5. Detail fabrication and installation of mobile shelving systems including methods of anchoring shelves to carriages and rails to building structure as required for seismic restraint.
 6. Include preliminary seismic up-lift calculation with initial bid.
 7. Include diagrams for power and control wiring.
 8. Include methods of connection for motors and controls and location of electrical rough-in.
- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- D. Delegated-Design Submittal: For mobile storage shelving, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Seismic Design Calculations: For seismic design of mobile storage shelving systems including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - a. Include seismic anchorage of rails and shelving analysis. Articulating flue spacers to be used where back to back carriages are specified as they will allow movement of rack while transferring loads across uneven floors. Rigid flue spacers will not be allowed.
 - b. On back-to-back configurations, individual wheel assemblies must be connected with an articulated carriage base/rack flue spacers in order to have the system track and transfer the rack loading equally to all carriage wheels.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mobile shelving systems and operating manuals to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating mobile storage shelving that meets or exceeds performance requirements indicated and of documenting this performance by test reports, and calculations.
 1. Manufacturer of electric mobile systems must have a minimum of 35 years' experience in the continuous manufacture of electrically operated mobile systems.
 2. Manufacturer must be ISO 9001:2008 certified.

- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of support rail anchors, embedded conduit, and other construction contiguous with mobile storage shelving by field measurements before fabrication.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of mobile shelving systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, and other materials beyond normal wear.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain mobile storage systems including shelving from single manufacturer.
- B. Basis-of-Design Products: The design for Mobile Storage Shelving is based on Spacesaver ActiveRAC systems.
 - 1. Mechanically activated systems: Spacesaver ActivRAC 7M.
 - 2. Powered systems: Spacesaver ActivRAC 16P
- C. Products by a manufacturer other than the Basis-of-Design product will be considered only upon prior approval of a pre-bid substitution request made in compliance with Division 01 Section "Product Substitutions and Options." Substitution requests must be accompanied by sufficient detailed documentation to allow the Architect to make a determination that the proposed product provides an equivalent system to the Basis-of-Design product. No post-bid substitutions will be allowed.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated-Design Submittal: For mobile storage shelving, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Seismic Performance: Mobile shelving systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

- C. Structural Performance: Provide mobile shelving systems capable of supporting the following:
 - 1. Load per Linear Foot of Carriage: 1000 lb/ft.
 - 2. Total Load: 7,000 lbs per carriage wheel and 16,000 lbs per carriage section.
- D. Operating Force: For manually operated systems, maximum 1 lbf required to move 4000 lb.

2.3 SYSTEMS AND COMPONENTS

- A. General: Provide manufacturer's standard mobile storage shelving systems and components. Where components are not otherwise indicated, provide manufacturer's standard components as required for a complete system.
- B. Fasteners: Furnish required concrete bolts and similar anchorage devices for installing track system, and furnish other components of work where installation of devices is specified in another Section.
- C. Tracks: Steel rails with tops machined to mate with guide wheels and with ends designed to provide smooth, secure continuity between sections without field welding. Provide mounting brackets, anchorage devices, adjustable leveling devices, and stops at terminations of rails to prevent carriages from running off track ends.
 - 1. Mounting: Recessed.
- D. Carriages: Rigid frames consisting of C-shaped cold-formed steel beams and cross beams, designed to allow secure anchorage of shelving units.
 - 1. Carriage Width: Nominal 3 feet to 4 feet as shown on drawings.
 - 2. Carriage Length: Nominal 5 feet to 8 feet as shown on drawings
 - 3. Wheels: Manufacturer's standard number of bearing-mounted, steel wheels, precision ground to mate with tracks.
 - 4. Bumpers: Provide two rubber bumpers with minimum depth of 1/2 inch each side.
- E. Anti-Tip Brackets: Mount on carriage for engagement with track system to secure units against tipping.

2.4 MECHANICALLY ASSISTED SYSTEMS

- A. Drive Systems: Geared transmission and chain systems with tensioning device to provide mechanical assistance and uniform movement along entire length of each carriage. Permanently shielded and lubricated.
- B. Drive Shaft: Continuous tubular or solid steel shaft, capable of transmitting torque from drive system without distortion.
- C. Locking Pins: Located on range end panels to allow locking of individual range carriage when depressed.

2.5 POWERED SYSTEMS

- A. Motors: UL-listed, DC voltage, geared, in-line motor for connection to 115-V ac power source. Size as required for loads indicated.
- B. Drive Shaft: Continuous tubular or solid steel shaft, capable of transmitting torque from motor without distortion.
- C. Control System: Manufacturer's standard operation system to automatically open aisles at selected locations with controlled acceleration and deceleration of carriages. Provide single controls centrally mounted on end panels.
- D. Safety Devices: Manufacturer's standard safety devices as required to stop carriage motion. Provide the following:
 - 1. Emergency Stop Button: Momentary contact, red push-button switch to immediately stop carriage motion. Provide sign or lettering on button indicating "Emergency Stop/Reset."
 - 2. Safety Sweep: Hinged safety bar consisting of an impact-pressure-activated, internal-contact switch plate mounted along full length of each carriage at bottom edge. Maximum 1 lbf results in immediate stop of carriage motion.
 - 3. Aisle-Length Presence Detector: Pulsed infrared, sender-receiver assembly operating along length of open aisle that prevents motion in adjacent carriages while aisle is occupied.
 - 4. Aisle Entry Presence Detector: Pulsed infrared, sender-receiver assembly at entry to open aisle that stops motion in adjacent carriages when aisle is entered and prevents motion while aisle is occupied.

2.6 ~~STEEL FOUR-POST SHELVING~~ WIDE SPAN SHELVING & PALLET RACK SHELVING (Addendum 2)

- A. ~~Steel Four Post Shelving: Shelving consisting of four angle iron uprights per section, with adjustable shelves resting on shelf supports hung on uprights. Configure units for mounting on mobile carriages. (Addendum 2)~~
- B. Shelving Units
 - 1. Type: Self-supporting unit.
 - 2. Configuration: Open.
 - 3. Shelf Styles: Provide the following styles and numbers of adjustable shelves:
 - a. Central Services *CS Storage B30 B122*: *Wide span Shelving with wire shelves, 24 inches deep, 3 shelves high. Minimum 1,000 lbs per shelf level. (Addendum 1)*
 - b. Commissary *Shelving Storage 153 167*: *Wide span Shelving with wire shelves, 18 inches deep, 4 shelves high. 1,000 lbs per shelf level. (Addendum 1)*
 - c. Commissary *Pallet Storage 156 166*: *3-Tier pallet system. 4,000 lbs per level. (Addendum 1)*

- C. ~~Uprights: Double-wall steel posts, 2 inches wide, 0.048 inch thick, in manufacturer's standard T-shape for common post use or L-shape at range ends, with keyhole perforations on the inner wall at 1-1/2 inches o.c.-(Addendum 2)~~
- D. ~~Steel Spacers: Provide 0.048-inch thick steel spacers, 3 inches high, welded to posts at bottom, center, and top of open units to prevent deflection.-(Addendum 2)~~
- E. Base: Manufacturer's standard for attachment to mobile carriages.
- F. *Sourcing: By same vendor as mobile carriages. (Addendum 2)*

2.7 STEEL FINISHES

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to achieve a minimum dry film thickness of 2 mils
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, minimum recess depth, and other conditions affecting performance of mobile shelving systems.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SLAB PREPARATION

- A. Provide appropriate containment measures to prevent concrete dust from migrating outside the work area.
- B. Saw cut concrete slab to sufficient depth and width to accommodate rail installation.
- C. Install grout to fill overcuts.

3.3 INSTALLATION

- A. Level and plumb tracks to a tolerance of 0.09 inch in 120 inches with no more than 0.06-inch variation between adjacent rails. Use permanent shims or non-shrink grout as indicated by manufacturer.
- B. Recessed Track Systems: Solidly fill gaps between slab and rail according to manufacturer's written instructions to secure tracks and prevent movement.

- C. Carriage Installation: Mount mobile carriages on track system with anti-tip brackets engaged by rails and adjust for smooth operation. Provide non-moving carriages where indicated securely fixed to rails.

3.4 SHELVING INSTALLATION

- A. Attach shelving units to carriages according to manufacturer's written instructions and as required to prevent vibration during movement.
 - 1. Level and plumb shelving units to a tolerance of 1/8 inch in 96 inches.
- B. Install shelves in shelving units at locations indicated on Drawings and according to manufacturer's written instructions.

3.5 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protect installed products from damage during remainder of the construction period.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain mobile storage shelving.

END OF SECTION 105626

SECTION 108000 – MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. The following items are included in this section:

- 1. Key box.
- 2. Shelf standards and brackets.
- 3. Baby changing table.

- B. Related Sections include the following:

- 1. Division 06 Section “Rough Carpentry” for blocking and backing.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

PART 2 - PRODUCTS

2.1 KEY BOX (Knox Box)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following or approved:

- 1. Basis of Design Product: Series 3200, recessed key box as manufactured by The Knox Company.

- B. Keying for key box shall match local Fire District key. Provide no keys with units.

- C. Install key box at location as shown or directed.

2.2 SHELF STANDARDS AND BRACKETS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following or approved:

- 1. Basis of Design Product: KV Shelving

- B. Shelving configuration: 8 inch deep adjustable wall mounted chrome wire shelves, including 8 inch deep double wire shelf brackets and 14 inch wall mounted post kits. Shelves to adjust on 1” centers.
- C. Refer to drawings for locations and layout. Provide backing at each standard.

2.3 BABY CHANGING TABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by the following or approved:
 - 1. Basis of Design Product: Koala Kare Products, Inc. Model KB100-ST:
- B. Mounting: Recessed-mounted, horizontal design.
- C. Color: As selected by Architect from manufacturer’s full range.
- D. Refer to drawings for locations and layout. Provide backing at all mounting points.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

END OF SECTION 108000

SECTION 110140 – INDUSTRIAL SAFETY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section Includes: Rooftop fall arrest and fall restraint anchors. System to be designed and installed by Bidder. See following article “Qualifications.”

1.3 DESIGN AND SPECIFICATION CONSIDERATIONS

- A. Fall restraint and fall arrest systems as required to meet WISHA regulations for Owner’s employees working on roofs.
- B. Attachment of anchors requires transfer of loads into building structural framing. Systems that only bolt into roof deck without transferring load are not accepted.
- C. Employees using systems are required by Washington State Department of Labor and Industries (L & I) Washington Industrial and Health Safety Act (WISHA) WAC 296-155-24505 to receive documented training in use of fall restraint and fall arrest systems.

1.4 REFERENCES

- A. Reference Standards: Current edition at date of Bid.
- B. Washington State Department of Labor and Industries WISHA Chapter 296-155 WAC Part C-1 Fall Restraint and Fall Arrest.
- C. Occupational and Safety Health Administration (OSHA) Standards:
 - 1. OSHA Rule on Fall Protection in General Industry (29 CFR 1910 Subpart I).
 - 2. OSHA Rule on Safety Standards for Fall Protection in the Construction Industry, (29 CFR 1910 and 1926, Subpart IV).
- D. ANSI Z359.1 - Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components.
- E. ANSI A10.14 - Requirements for Safety Belts, Harnesses, Lanyards, and Lifelines for Construction and Demolition Use.
- F. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 53 - Standard Specification for Pipe, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

2. ASTM A 123- Standard Specification for Zinc (Hot-Dipped) Galvanized Coatings on Iron and Steel Products.
 3. ASTM B 221 - Specification for Aluminum and Aluminum Alloy Extruded Bars, Rod, Wire, Shapes, and Tubes.
- G. American Welding Society (AWS):
1. AWS D1.1 - Structural Welding Code -Steel.
 2. AWS D1.2 - Structural Welding Code -Aluminum.

1.5 DESIGN REQUIREMENTS

- A. Conform to WISHA for fall arrest and fall restraint systems.
- B. Fall Arrest and Fall Restraint Anchors: Permit free movement of persons over entire roof while attached by full body harness, retractable life line, and vertical life line attached to D-ring or eye at each fall arrest anchor using quick release attachments.
- C. Upright Anchors: As instructed by manufacture in layout and design acceptable to Architect.
- D. Pullout Force: Design fall arrest anchors and connections to resist 5,000 pound pullout force without failure.
- E. Arrest Force: Limit to 1,800 pound or less.
- F. Free Fall Distance: Limit to 6 foot.

1.6 SUBMITTALS

- A. Submit under provisions of Division 01 Section "Submittal Procedures."
- B. Shop Drawings:
 1. Show rooftop locations of fall arrest anchors, configurations, dimensions, attachment details, and components required for complete fall arrest system conforming to provisions of this Section.
 2. Show interfacement with adjacent materials.
 3. Bear seal and signature of professional structural or civil engineer, employed by manufacturer, licensed in State of Washington, responsible for design.
- C. Product Data: Descriptive product literature with relevant data highlighted. Include physical characteristics, performance data, and limitations.
- D. Structural Calculations:
 1. Design to safety factor conforming to WISHA for structural connections and components.
 2. Design connections and reinforcement as required to resist specified pull out and arrest forces.

3. Bear seal and signature of structural or civil engineer, employed by manufacturer, licensed in State of Washington, responsible for design of anchors and attachments.
 - E. Manufacturer's Instructions: Include Installation Instructions, special procedures, and conditions requiring special attention.
 - F. Certification: Written statement signed by manufacturer's authorized representative. Certify that fall arrest system complies with provisions of this Section, including:
 1. System: Engineered and designed to accommodate roof deck, roofing type, structural requirements, and watertight seal at roofing system.
 2. Installer: Certified as authorized by manufacturer.
- 1.7 CLOSEOUT SUBMITTALS
- A. Project Record Drawings: Submit under provisions of Division 01, Section "Project Closeout." Show location of each fall arrest anchor as installed.
 - B. Submit two (2) copies of Plexiglas mounted roof plan drawing, for posting near roof access points, showing anchor locations and details.
 - C. Maintenance and Operating Data: Submit under provisions of Division 01, Section "Project Closeout." Include manufacturer's maintenance procedures, safety inspection log book for yearly inspections.
- 1.8 QUALIFICATIONS
- A. Manufacturer:
 1. Company specializing in work of this Section with minimum 5 years documented experience.
 2. Employing complete engineering and technical personnel needed to engineer, design, and perform work of this Section.
 - B. Installer:
 1. Manufacturer or certified by manufacturer as qualified to perform work of this Section.
 2. Able to document minimum 3 years' experience in successful installations of manufacturer's fall arrest and fall restraint systems.
- 1.9 REGULATORY REQUIREMENTS
- A. Conform to Washington State Department of Labor and Industries WISHA Chapter 296-155 WAC Part C-1 Fall Restraint and Fall Arrest.
 - B. Conform to additional requirements of OSHA - Occupational and Safety Health Administration Standards, except where in conflict with adopted WISHA regulations.

- C. Welding: Conform to Division 5. Perform welding by welding operators currently certified by WABO.

1.10 PRE-INSTALLATION CONFERENCE

- A. Arrange between Contractor, Roofing and Deck Subcontractors, Owner, Owner's roofing maintenance supervisor, Architect, manufacturer's representative, and others as requested to attend.
- B. Meet within time period needed to coordinate work of related Sections with work of this Section.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Conform to manufacturer's instructions.

1.12 COORDINATION

- A. Conform to Division 01, Section "Project Coordination" for coordination with work of other Sections.

PART 2 - PRODUCTS

2.1 POST TYPE FALL PROTECTION ANCHOR SYSTEMS

- A. Manufacturer:
 - 1. Guardian: Tel: 800-466-6385, www.guardianfall.com.
 - 2. Summit Anchor Company: Tel: 800-372-1098, www.summitanchor.com.
- B. Basis of Design Product: Guardian Fall Protection; CB 18 Series Roof Anchor, welded to structural support.

2.2 FABRICATION

- A. Fabricate engineered fall restraint and fall arrest system suitable for roof and structure mounting with welded steel base plate and steel plate uprights or steel pipe uprights.

2.3 FINISHES

- A. Steel Pipe Uprights, Base Plates, D-Rings, Cables, and Clamps: Stainless steel, spun aluminum, or carbon steel hot-dip galvanized after fabrication. Galvanize carbon steel to following standards:
 - 1. Pipe: ASTM A 53.
 - 2. Plate: ASTM A 123.
 - 3. D-Rings: ASTM A 123 or ASTM A 153.
 - 4. Galvanizing Repair Compound: 95 percent zinc cold galvanizing compound, as specified Division 05, Section "Metal Fabrications."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions as satisfactory to receive work of this Section. Do no work until correction of unsatisfactory conditions. Beginning work constitutes acceptance of existing conditions.
- B. Verify layout of roof fall arrest anchors and structural connections suitable for work of this Section.

3.2 INSTALLATION

- A. Install fall arrest system in accordance with manufacturer's instructions and provisions of Contract Documents. Where in conflict verify with Architect before beginning work.
- B. Lay out fall arrest system according to Architect accepted shop drawings.
- C. Isolate dissimilar metals to prevent contact.

3.3 ADJUSTING

- A. Repair or replace defective installations not conforming to provisions of Contract Documents.
- B. Field touch up damaged galvanizing surface finishes with galvanized finish with galvanizing repair compound.

END OF SECTION 110140

SECTION 11 08 00 – COMMISSIONING OF EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- a. System specific commissioning procedures

B. Related Sections:

- a. The following sections specify commissioning activities for this project:

- 01 91 13 – General Commissioning Requirements

- b. All sections related to the following commissioned systems may contain start-up, testing and/or commissioning related activities:

- Walk-in cold storage rooms

1.2 DESCRIPTION OF WORK

- A. Work includes the completion and documentation of formal commissioning procedures by the Contractor on selected equipment and systems as listed under 1.1 B. Commissioning is defined as the process of verifying and documenting that the installation and performance of selected building systems meet the specified design criteria and therefore satisfies the design intent and the Owner's operational needs. The Contractor shall be responsible for participation in the commissioning process as outlined herein, and in subsequent sectional references and attachments throughout the project documents. Commissioning procedures shall be designed and conducted under the direction of the Commissioning Authority (CxA) and coordinated by the Contractor Commissioning Coordinator (CCC).
- B. This section contains the system specific commissioning requirements for the systems referenced herein.

PART 2 – PRODUCTS

- 2.1 Documentation requirements for the systems to be commissioned are specified in Section 01 91 13, Part 2 – Products.

PART 3 – EXECUTION

- 3.1 Execution of the commissioning process for the systems to be commissioned is specified Section 01 91 13, Part 3 – Execution.

SCHEDULE A – Start-up Plan , Contractor Checklists and Document Tracking

A Startup Plan shall be developed as outlined in Section 01 91 13. The Startup Plan shall include manufacturer's startup procedures and Contractor Checklists (CCL) as provided by the CxA.

Sample CCLs are included in this Schedule. The Contractor responsible for delivery of the equipment and appurtenances associated with the systems listed in Table – A shall be responsible for completion of the CCL for each individual piece of equipment in the system group. The CCLs included within this Schedule are sample versions and are representative of what will be included in the final Commissioning Plan.

The Contractor is responsible to demonstrate the proper operation of all installed systems and the final CCLs shall contain the requirements to document these demonstrations. In no case shall the checklists require performance criteria more stringent than specified by the Project Documents.

The CCC is responsible for collecting the completed CCLs and start-up documents and maintaining the Startup Plan during installation and startup activities. The CCC shall review the material for completeness, then sign off on the CCLs as an indication that documents are complete. Once all CCLs and start-up documents are received, they shall be turned over to the CxA.

The following Table - A identifies the CCLs and related documents that will be included in the final Startup Plan. Listed as subcategories below each system are the documents that shall be required to be submitted as part of the system startup activities. This documentation includes installation, startup, static tests, pressure tests, cleaning, flushing, disinfecting, certifications and other miscellaneous checklists. This table shall be used as a document tracking mechanism by the CxA, CCC and Contractor for the process of submittal, review and approval of installation and startup documents and CCLs. The table shall be included in the Startup Plan, which is a subset of the Commissioning Plan.

Table-A Key:

- A. System description for each system commissioned. A Contractor Checklist is included for each commissioned system. The subcategories include required documentation to be submitted with the CCL.
- B. Contractor responsible for installation, startup, testing and submittal of documents for commissioned system. To be filled in after contract award.
- C. Date the proposed documents are received by the CxA from the responsible Contractor. NOTE: These documents shall include, but are not limited to, procedures and forms to include such activities as: manufacturer's installation and start-up, pressure testing, TAB, cleaning, flushing and disinfection. The CCL is provided by the CxA.
- D. Indicates that CxA has received and approved proposed installation and start-up documentation.
- E. Date the completed documents are received by the CxA from the responsible Contractor.
- F. Indicates that CxA has received and approved completed documentation.
- G. Notes on status of forms, irregularities and rework needed

Table - A: System Summary and Documentation Tracking

A	B	C	D	E	F	G
System Description Documents Required	Responsible Contractor	Proposed Document Received	OK	Completed Document Received	OK	Notes
Walk-in Freezer/Refrigerator						
Manufacturer Start-up Documentation						
Contractor Checklist		CxA Provided				
Kitchen Hood Systems						
Manufacturer Start-up Documentation						
Contractor Checklist		CxA Provided				

SAMPLE
Walk-In Cold Storage Room
Contractor Checklist

Location: _____ **Area/Room Served:** _____
Manufacturer: _____ **Model:** _____

Check	RC	CxA	Note
Walk-In Box			
Area is cleaned and clear of construction debris.			
Equipment is clean and has no visible physical damage.			
Latches and hinges installed and operational.			
Condition of door seals.			
Door heaters installed and connected to power.			
Evaporator Unit			
Equipment is clean and has no visible physical damage.			
Manufacturer's required maintenance clearance provided.			
Mounted per project documents and installation instructions.			
Refrigerant piping and insulation installed.			
Condensate drain installed with cleanout.			
Condensate drain is insulated.			
Condensate drain heat trace installed.			
Nameplate Minimum Circuit Ampacity (Amp)			
Nameplate Maximum Overcurrent Protection Device (Amps)			
Installed overload.			
Overloads and/or fusing is appropriate.			
Control wiring and devices are installed.			
Supply power is installed and disconnect is accessible.			
Disconnect is labeled.			
Convenience outlet within 50' of equipment.			
Condensing Unit			
Equipment is clean and has no visible physical damage.			
Manufacturer's required maintenance clearance provided.			
Mounted per project documents and installation instructions.			
Equipment labels are installed per project documents.			
Refrigerant piping and insulation installed.			
Control wiring and devices are installed.			
Supply power is installed and disconnect is accessible.			
Disconnect is labeled.			
Nameplate Minimum Circuit Ampacity (Amp)			
Nameplate Maximum Overcurrent Protection Device (Amps)			
Installed overload.			
Overloads and/or fusing is appropriate. (135% of FLA +next standard size)			
Convenience outlet within 50' of equipment.			
Control Devices			
Tamper devices are installed and connected to fire alarm system			
Fire flow devices are installed and connected to fire alarm system			

Start-Up			
Refrigeration piping cleaned, leak checked, evacuated then charged with refrigerant.			
Motor operation and rotation verified.			
Compressor operation and cooling verified.			
Internal controls and safeties verified operational.			
External controls verified operational			
Start-up documentation submitted to CxA.			
Readiness			
System is ready for functional performance testing			
Representative photograph provided			

Sign-Off:

Team Member	Name	Date
Responsible Contractor (RC):		
Commissioning Authority (CxA):		

Notes:

SCHEDULE B – Functional Performance Tests

Functional Performance Tests

- 1 The preliminary versions of the Functional Performance Test and Verification Outline sheets contained in this Schedule define the individual systems to be tested and Contractor responsibilities based on the specific method of commissioning. These preliminary Functional Performance Test and Verification Outline sheets represent information available at the time of commissioning specification development. The final versions may be somewhat different and will be included within the Commissioning Plan as presented at the initial commissioning coordination meeting.
- 2 The methods of functional performance test and verification are listed in Table 1 of this Schedule. The Contractor will be responsible for supporting the testing activity as indicated. This may include developing the test plan and functional performance test forms for approval by the Commissioning Authority, performing testing to be witnessed by the CxA or providing support during functional performance testing conducted by the CxA or their sub-Authority.
- 3 Contract documents state that the Contractor is responsible to demonstrate that all systems comply with contract requirements and meet the project design intent. The scope of testing outlined in the following Functional Performance Test and Verification Outline sheets in this Schedule represent the minimum expected level of testing to be performed during commissioning. The contractor shall be required to conduct and document any tests as necessary to prove all systems comply with the design intent. If systems fail the initial tests additional testing may be required.
- 4 The following Test Summary Table identifies the functional tests that will be conducted on this project. This table will be used as a document tracking mechanism for the process of submittal and review of contractor provided testing documentation.
- 5 The contractor is responsible for submitting proposed functional test documentation to the Commissioning Authority for review and approval at least one month prior to these activities. It is the Contractor's responsibility to notify the Commissioning Authority in advance of the scheduled activity, testing or startup date. A minimum of 5 working days advance notification is required. If the CxA is not notified in advance of a scheduled start-up or testing activity, the start-up or testing shall be rescheduled and repeated to the satisfaction of the CxA.
- 6 The "Responsible Contractor" column of the table will be completed during the Initial Commissioning Coordination Meeting by assigning an individual Contractor responsible for the activities associated with each system based on what contractor provided that system.

Table – B: Functional Test Summary Table

A	B	C	D	E	F	G
	Responsible Contractor	Proposed Test Forms Received	O K	Testing Complete	O K	Notes
Walk-in Freezer/Refrigerator						
Kitchen Hood Systems						

Summary Table Key:

- A. System description for each system commissioned.
- B. Contractor responsible for providing testing. To be filled in after contract award.
- C. Date the proposed test forms are received by the CxA from the responsible Contractor (if applicable).
- D. Indicates that CxA has received and approved the proposed test forms.
- E. Date(s) testing was performed by contractor.
- F. Indicates that Commissioning Authority has witnessed and approved the testing and received all completed test forms.
- G. Notes on status of forms, irregularities and rework needed.

Table 1 – Functional Test and Verification Methods

The following applies regardless of test method.

The contractor shall support the CxA during testing or verification, including but not limited to: scheduling and sequencing and adequate time for testing, on-site support during testing, testing instruments and equipment, setting up trend logs, providing access to equipment (including lifts), providing access to control systems both on-site and remotely.

The CxA shall do one or a combination of the following to verify contractor testing:

1. The CxA shall witness all or portions of the tests during contractor testing.
2. The CxA shall re-conduct the functional tests on all or portions of the systems using the same test plan and data sheets.
3. The contractor shall be required to duplicate some of the testing by demonstrating a percentage of the system as selected and witnessed by the CxA.

If during the verification process inconsistencies are found that demonstrate that the functional testing conducted by the contractor was not properly executed, the CxA shall suspend verification and the contractor shall be required to correct the problems and re-conduct the entire functional test and verification for the system(s) in question. Excessive test failures shall be subject to the back-charging provisions in Section 01 91 13.

Test Method A – Contractor Written and Conducted with CxA Oversight

The test plan and test data sheets are developed by the contractor responsible for the system and submitted to the CxA for approval. These can be the system manufacturer's stock test forms if appropriate. The CxA shall assist contractor in development of test forms if requested to do so. The contractor shall conduct the tests on 100% of the equipment per the plan, document results and submit completed test forms to the CxA for review and approval.

Test Method B – CxA Written and Conducted, Contractor Supports

The test plan and test data sheets are developed by the CxA. The CxA shall conduct the tests per the plan, document results and notify contractor of any issues found.

Test Method C – CxA Written, Contractor Conducts

The test plan and test data sheets are developed by the CxA. The CxA shall turn over the test plan and test data sheets to the contractor. The contractor shall conduct the tests on 100% of the equipment per the plan, document results and submit completed test forms to the CxA for review and approval.

**Food Service Equipment
Functional Test and Verification Outline**

The testing outlined below represents the minimum expected level of testing to be performed during commissioning. The contractor shall be required to conduct and document any tests as necessary to prove all systems comply with the design intent. Table 1 in Schedule-B details the various methods of accomplishing functional testing.

Testing:

Test Method	Plan & Data Sheets By:	Conducted By:	Demonstration Percentage	CxA Will Sample or Witness
A.1	Contractor	Contractor	N/A	100%

Functional Tests:

- 1) Walk-in Freezers/Refrigerator
 - a) Demonstrate operation of all features.
 - b) Demonstrate temperature control.
 - c) Demonstrate BCS Interface/Alarms
- 2) Kitchen Hoods
 - a) Demonstrate operation of all features.
 - b) Demonstrate on/off control and any interlocks.
 - c) Demonstrate building control system Interface.
 - d) Demonstrate fire suppression operation and interfaces.

PART 4 - Sample Documents

- 4.1** Sample functional test procedures and data forms are provided in this section to demonstrate the rigor of the process, test procedures and documentation that will be required from the contractor. These forms and procedures will be amended, augmented and updated in the final commissioning plan based on the final project documents, addendums and submittal information. **This sample section does not contain all functional test procedures and data forms that are required to be executed by the contractor.** Schedule - B of Part 3 provides a full list of the functional tests that will be required to be executed by the contractor.

Sample Functional Test Procedure

Walk-in Coolers

UNIT:	C1	C2	C3	C4
Unit operating temperature				
Measured temperature				
DDC temperature				
Evaporator fans operational				
Condensing unit compressor and fans operational				
Lights verified operational				
Door sensors verified operational				
Condensate heat tape verified operational				
Tests complete.				
Performance is acceptable				
Overrides clear, set points returned to original				

Sign-Off:

Team Member	Print Name/Co.	Initial	Date
Installing Contractor:			
CxA:			

Comments:

Freezer/Cooler Alarms

1. Verify freezer and cooler are operating below high temperature alarm.
2. Simulate a temperature above the high temperature alarm by lowering the high temperature alarm set point.
3. Verify an alarm is generated.
4. Clear alarms and return set points to original setting.

	Freezer	Cooler
<i>Pre-Test:</i>		
Zone Temperature		
High Temperature Alarm set point		
<i>Test:</i>		
High Temperature Alarm set point lowered to:		
Alarm generated?		
Reset Ok?		
Issue		

Tests are complete and performance is acceptable.

Sign-Off:

Team Member	Print Name/Co.	Initial	Date
Controls Contractor:			
CxA:			

Comments:

END OF SECTION 110800

SECTION 111313 - LOADING DOCK ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Loading dock bumpers.
 - 2. Loading dock seals.
 - 3. Overhead door track protector.
 - 4. Interior bollards
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 08 Section "Sectional Overhead Doors."
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product Data: For each type of loading dock accessory.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section "Submittal Procedures" for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Loading Dock Supply, Inc.
2. Beacon Industries, Inc.
3. Blue Giant Equipment Corporation.
4. Kelley; 4Front Engineered Solutions, Inc.
5. Nova Technology International.
6. Pioneer Dock Equipment.

2.2 DOCK BUMPERS

- A. General: Surface-mounted bumpers; of type, size, and construction indicated; designed to absorb kinetic energy and minimize damage to loading dock structure.
- B. Extra Long Laminated-Tread Dock Bumper: Fabricated from multiple, uniformly thick plies cut from fabric-reinforced rubber tires.
 1. Thickness: 4-1/2 inches .
 2. Horizontal Style: 12 inches high by 113" width.
 3. Basis of Design Product: Loading Dock Supply Model B4512-111-AD-T.
- C. Materials: ASTM 36/A 36M for steel plates, shapes, and bars. Hot-dip galvanize according to ASTM A 123/A 123M.

2.3 DOCK SEALS

- A. General: Surface-mounted vinyl seals at sides and top of loading dock opening, with pressure treated wood backing, high density foam core and wear shields.
- B. Dock Seal: 8 inch deep x 12 inch wide x 10 foot tall sides with full length yellow guide strips. 8 inch deep x 24 inch high x 9 foot – 6 inch long header.
 1. Basis of Design Product: Loading Dock Supply Model 40CS8C.

2.4 TRACK PROTECTORS

- A. General: Steel floor/wall mounted guards to protect door tracks from damage.
- B. Door Track Guards: 48-inch tall 3/16 inch steel track guards with chamfered top edge welded to 5/8 inch floor plate, wrap-around design with right and left hand styles, painted safety yellow enamel over gray primer coat.
 1. Basis of Design Product: Loading Dock Supply Model DG48.

2.5 BOLLARDS

- A. General: Floor mounted bollards located per drawings to protect shelving and equipment.
- B. Interior Bollards: 6 inch I.D. schedule 40 pipe, 48 inches high, welded to 10" x 10" x 5/8 inch base plate painted safety yellow with a black plastic cap at the top.
 1. Basis of Design Product: Loading Dock Supply Model SRB48-6

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Dock Bumpers: Attach dock bumpers to face of loading dock in a manner that complies with requirements indicated for spacing, arrangement, and position relative to top of platform and anchorage.
 - 1. Bolted Attachment: Attach dock bumpers to preset anchor bolts embedded in concrete or to cast-in-place inserts or threaded studs welded to embedded-steel plates or angles. If preset anchor bolts, cast-in-place inserts, or threaded studs welded to embedded-steel plates or angles are not provided, attach dock bumpers by drilling and anchoring with expansion anchors and bolts.
 - 2. After completing installation of exposed, factory-finished dock bumpers, inspect exposed finishes and repair damaged finishes.

- B. Dock Seals: Attach dock-seal support frames securely to building structure in proper relation to openings and dock bumpers to ensure compression of dock seals when trucks are positioned against dock bumpers.
 - 1. Adjusting: After completing installation, inspect exposed factory finishes and repair damaged finishes.

- C. Track Protectors and Interior Bollards: Coordinate locations to assure operational clearance for items being protected. Attach protectors and bollards by drilling and anchoring with expansion anchors and bolts.

END OF SECTION 111313

SECTION 114000 – FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES: Foodservice Equipment

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 0 and Division 1 Specification Sections, apply to this Section.

1.2 RELATED WORK:

- A. Rough-ins and Final Connections: Service lines from rough-in to point of final connections are provided by plumbing and electrical contractors.
- B. Electrical: Wiring, conduit, fuses, breakers, final disconnects, junction boxes, and other required electrical apparatus not built-in or mounted on equipment are provided by electrical contractor.
- C. Plumbing: Controls, regulators, valves, stops, traps, strainers, checks, grease traps, and fittings not mounted on/in equipment are provided by plumbing contractor.
- D. Mechanical: Ductwork from above finished ceiling to building exhaust and supply fans, flue pipes, exhaust and supply fans for hoods, room ventilation, and air supply blowers are provided by mechanical contractor.
- E. Miscellaneous
 - 1. Provides backing plates or blocking in wall or ceiling partitions.
 - 2. Provides fittings secured to structural ceiling to accommodate hangers.
 - 3. Provides the forming of architectural enclosures, floor, wall openings or recesses for equipment.
 - 4. Caulks and seals Cold Storage Room floor sections to building floor.
 - 5. Finishes floors (masonry or poured-in-place) in cold storage rooms, concrete curbs and pads.

1.3 SYSTEM DESCRIPTION

- A. Delegated Design: Design canopy hoods with fire protection system, walk-in cold storage rooms, and seismic restraint of equipment using performance requirements and design criteria per codes, including comprehensive engineering analysis by a qualified professional engineer licensed by the State in which the project resides.
- B. Fabricated Equipment: Constructed to configuration, dimension, detail, and design as shown with materials and workmanship as specified.
- C. Manufactured Equipment: Mass produced and referenced by manufacturer's name and model number.

- D. Each model number includes the code *H011 as a suffix. This code is known as the Specified Identification System. It is not to be removed by the bidders. Its purpose is to identify the Food Service Consultant to the vendors providing equipment in the event it is necessary to communicate questions, clarifications, and comments, from prior to bid award through the final purchase. It is to be used on all correspondence, including fax and e-mail, when communicating with manufacturer representatives and factories.

1.4 DEFINITIONS:

- A. Furnish - Supply and deliver to Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- B. Install (set in place) - Work at Project Site, including actual unloading, unpacking, assembly, erecting, rigging, placing, anchoring, applying, finishing, curing, protecting, cleaning, and similar operations, ready for final utility connections by other Sections as appropriate.
- C. Coordinate – Relay required information requested by other trades to ensure they are able to correctly perform their work related to the food service or laundry equipment installation.
- D. Provide - Furnish and install complete, ready for intended use.
- E. Kitchen Equipment Contractor (KEC) - All references to the Contractor in this Section 114000 shall refer to the Kitchen Equipment Contractor (KEC). Reference to any other Contractor shall be specific, such as General Contractor, Plumbing Contractor, Electrical Contractor, Architect, designated, etc.

1.5 LAWS, ORDINANCES AND STANDARDS:

- A. STANDARDS: Except as otherwise indicated, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:
 - 1. Air Conditioning and Refrigeration Institute (ARI): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components, and installation.
 - 2. American Gas Association (AGA): Comply with AGA standards for gas heated equipment and provide equipment with the AGA seal. Automatic safety pilots shall be provided on all equipment, where available. (Canadian Gas Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
 - 3. American National Standards Institute (ANSI): Comply with ANSI Z21-Series standards for gas-burning equipment and provide labels indicating name of testing agency.
 - 4. American National Standards Institute (ANSI): Comply with ANSI B57.1 for compressed gas cylinder connections and with applicable standards of the Compressed Gas Association for compressed gas piping.
 - 5. American National Standards Institute (ANSI): Comply with ANSI A40.4 and A40.6 for water connection air gaps and vacuum breakers.
 - 6. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): Comply with the applicable regulations and the latest edition of standards for remote refrigeration system(s), components, and installation.
 - 7. American Society of Mechanical Engineers (ASME): Comply with ASME Boiler Code requirements for steam generating and steam heated equipment and provide ASME inspection, stamp, and registration with National Board.

8. American Society for Testing and Materials (ASTM): Comply with ASTM C1036 for flat glass.
9. American Society for Testing and Materials (ASTM): Comply with ASTM C1048 for heat-treated flat glass – Kind HS, Kind FT coated and uncoated glass.
10. American Welding Society (AWS): Comply with AWS D1.1 structural welding code.
11. National Electric Code (NEC): Comply with NFPA Volume 5 for electrical wiring and devices included with food service equipment, ANSI C2 and C73, and applicable NEMA and NECA standards.
12. National Electrical Manufacturers Association (NEMA): Comply with NEMA LD3 for high-pressure decorative laminates.
13. National Fire Protection Association (NFPA): Comply with the applicable sections of the NFPA for exhaust hood, ventilators, duct and fan materials, hoods fire suppression systems, construction and installation, as well as local codes and standards.
14. National Sanitation Foundation (NSF): Comply with the latest Standards and Revisions established by NSF for equipment and installation. Provide NSF Seal of Approval on each applicable manufactured item and on items of custom fabricated work. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.)
15. Sheet Metal and Air Conditioning Kitchen Equipment Contractor (KEC)'s National Association (SMACNA): Comply with the latest edition of SMACNA guidelines for seismic restraint of kitchen equipment and applicable local regulatory agencies requirements.
16. Underwriters Laboratories (UL): Provide either UL labeled products for electrical components and assemblies or, where no labeling service is available, "recognized markings" to indicate listing in the UL "Recognized Component Index". (Canadian Standards Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
17. UL 300 Standard: Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with these requirements.
18. American with Disabilities Act (ADA): Comply with requirements as applicable to this Project.
19. Refrigeration Service Engineers Society (RSES): Comply with the applicable regulations, the latest edition of standards for remote refrigeration system(s), components and installation, and the 1995 requirements of the Montreal Protocol Agreement.
20. All refrigerants used for any purpose shall comply with the 1995 requirements of the Montreal Protocol Agreement and subsequent revisions and amendments. No CFC refrigerants shall be allowed on this Project.
21. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.
22. Comply with all applicable local codes, standards and regulations, and any special local conditions (example only: City of Los Angeles Testing Lab requirements or seismic standards compliance).
23. Jails, prisons, and all detention facilities shall comply with Correctional Standards as applicable to the specific Project. Verify the level of security and construction required with the Project Architect and provide all items in compliance. As a minimum, no part or component of any item provided shall be easily removable and used as a weapon.
24. Subway grating installed in floor drain troughs must meet IBC 1104.3.1 standards for maximum opening sizes in grates.
25. Confirm all drawings, specifications, and project documentation meet all federal, state, and local codes and regulations.

1.6 KITCHEN EQUIPMENT CONTRACTOR (KEC) QUALIFICATIONS:

- A. In addition to requirements of Related Sections 1.02, submit evidence of compliance with the following qualifications and conditions:
1. Five (5) years minimum continuous operation under the same company name and ownership.
 2. Evidence of Company's financial stability and financial ability to complete this Project without endangering that stability.
 3. List a minimum of comparable size and scope projects completed in the last five (5) years with Owner's contact name and telephone number.
 4. Have manufacturer's authorization to purchase, distribute, and install all items specified with this Project.
 5. Maintain a staff or have access to personnel with a minimum of five (5) years experience in the installation of comparable size and scope projects, and meeting NSF standards and requirements. (UL Sanitation standards and requirements may be accepted if acceptable to local code jurisdictions.)
 6. Maintain or have access to a fabrication shop meeting NSF standards and labeling requirements. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.) If other than the Kitchen Equipment Contractor (KEC)'s own fabrication shop, they shall have five (5) years minimum experience in the fabrication of comparable size, scope, and level of quality projects. The Kitchen Equipment Contractor (KEC) shall submit their company name and credentials to the Architect, who shall have the right of approval or disapproval
 7. Maintain a staff or have access to personnel experienced in the preparation of professional style shop drawings and submittals.
 8. Maintain or have access to manufacturer's authorized service personnel together with readily available stock of repair and replacement parts.
 9. Any sub-Kitchen Equipment Contractor (KEC) employed by Kitchen Equipment Contractor (KEC) for this Project shall comply with the same qualification requirements.

1.7 SUBSTITUTIONS:

- A. Refer to Division 1 for Substitution Request requirements.

1.8 APPROVED SUBSTITUTIONS AND/OR LISTED ALTERNATES:

- A. Substitutions approved as noted in article 1.07 and/or any Listed Alternate Manufacturers listed in these Itemized Specifications or added by Addendum may be utilized in lieu of the primary specified manufacturer with the following conditions and understanding:
1. The Project Documents are designed and engineered using the primary specified manufacturer and model. The Kitchen Equipment Contractor (KEC) shall assume total responsibility for any deviations required due to the utilization of a substitution/alternate manufacturer or model including, but not limited to, fitting alternates into the available space, providing directions for required changes, and assuming any and all associated costs for utility, building, food service design, architectural, or engineering changes directly or indirectly related to the substitution.

2. The Kitchen Equipment Contractor (KEC) shall be responsible for supplying the model, which is equal to the primary specified model in regards to general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If the Owner or their appointed representative determines at any time during the construction and installation, prior to the final acceptance of the Project, that the substitution/alternate model submitted is not equal to the primary specified model, the Kitchen Equipment Contractor (KEC) shall assume all associated cost and implications required to replace the model submitted with the correct model.
3. The bid proposal shall clearly state any substitutions/alternates which will be utilized, including the manufacturer and model number. The proposal shall also include a data sheet for each substitution/alternate with any and all deviations between the primary specified manufacturer and the substitution/alternate manufacturer itemized and listed on the data sheet. The manufacturers' cut sheets are not acceptable as a substitute for the data sheet. Complex alternates, such as utility distribution systems, exhaust hoods, ventilators, etc., shall include a shop drawing specific to the Project.
4. Inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Kitchen Equipment Contractor (KEC) to ensure that the alternate unit submitted matches the primary specified unit and meets the other conditions, as stated above.
5. Manufacturers not approved as substitutions or listed as a Listed Alternate will not be permitted unless submitted for prior approval, as described above and in the General and Supplementary Conditions and applicable Division-1 Specifications Sections.
6. Submittal of a substitution/alternate manufacturer or model shall indicate agreement to the above stated conditions. Solely at the Owner's discretion, failure to comply with any of these conditions or to supply complete and correct data information shall result in the Kitchen Equipment Contractor (KEC) being required to provide the primary specified manufacturer at no additional cost to the Owner or to adjust the Contract cost.

1.9 DISCREPANCIES:

- A. Where discrepancies are discovered between the drawings and the specifications regarding quality or quantity, the higher quality or the greater quantity shall be included in the Bid Proposal. The Kitchen Equipment Contractor (KEC) shall notify the Architect, in writing, of any discrepancies discovered and await clarification prior to proceeding with the items or areas in question.

1.10 SUBMITTALS:

- A. The Kitchen Equipment Contractor (KEC) shall review all submittals for basic compliance with the Contract Documents and correct as required prior to submitting to the Design Team (Architects/Engineers/ Consultants/Owner) for review. Failure to comply with this requirement, the submission of submittal(s) which are significantly inconsistent with the Contract Documents, or inconsistencies that are discovered during review by a Design Team member shall be justification for reimbursement by the Kitchen Equipment Contractor (KEC) to the Design Team member's company for the "lost" time or for the time required for a second review.

B. Rough-In Drawings:

1. Submit electronic PDF file for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
2. Submit 1/4-inch (1:50) scale rough-in drawings for approval. These drawings shall be dimensioned from grid lines showing location of ducts, stubs, floor and wall sleeves for ventilation, plumbing, steam, electrical, refrigeration lines, beverage lines, concrete base and curb dimensions as required for equipment so supported.
3. Site-verify mechanical, electrical and ventilating rough-in and sleeve locations.
4. The Kitchen Equipment Contractor (KEC) shall be responsible for the accuracy of the information on their submittals.
5. In the event rough-ins have been accomplished before the award of this contract, the Kitchen Equipment Contractor (KEC) shall check the existing facility and make adjustments to their equipment to suit building conditions and utilities, where possible. If not possible, the Kitchen Equipment Contractor (KEC) shall so state in a letter to the Owner and Architect with reasons and an alternate method and pricing.

C. Shop Drawings:

1. Submit electronic PDF file for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
2. Submit shop drawings for items of custom fabrication included in this contract. Shop drawings shall be submitted at 3/4-inch (1:20) and/or 1-1/2 inch (1:10) scale and shall show dimensions, materials, details of construction, features and options, installation and relation of adjoining work requiring cutting or close fitting. Shop drawings shall also indicate reinforcements, anchorage and related work required for the complete installation of fixtures.
3. Before proceeding with the fabrication of any item, the Kitchen Equipment Contractor (KEC) shall be responsible for verifying and coordinating all dimensions and details with site dimensions and conditions.

D. Product Data Submittal Manuals:

1. Submit electronic PDF file of Product Data Submittal Manuals with a cover sheet and detailed information on every item included in this Section for approval. Detailed information shall include, but not be limited to, item number, description, quantity, model numbers, options and accessories provided, exact utility requirements, manufacturer's cut-sheets, reference to specific shop drawings, etc. Distribute one additional copy of installation and start-up instructions to the Installer. Mark each data sheet with the applicable project equipment item number. Each data sheet shall include NEMA plug and receptacle configuration for applicable items, where applicable. Every cover sheet and associated detailed submittal shall provide sufficient and complete information to verify that the Kitchen Equipment Contractor (KEC) is providing each item in compliance with the Contract documents.

2. Architect review of drawings, shop details, product data brochures, and service and parts manuals is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Kitchen Equipment Contractor (KEC) from compliance with the contract documents or departures there from. The Kitchen Equipment Contractor (KEC) remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing their work in a safe, satisfactory, and professional manner.

1.11 OPERATION AND MAINTENANCE DATA MANUALS:

- A. Operation And Maintenance Manuals (Service And Parts Manuals): Three (3) bound sets of manuals shall be furnished for items of standard manufacture on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner. Manuals shall be in alphabetical order according to manufacturer, including item numbers and utility options provided for the equipment installed.
 1. Installing company's name, address, telephone number, and date of completed installation.
 2. Serial numbers of principal pieces of equipment.
 3. Part numbers of all replaceable items.
 4. Lubrication data and belt sizes.
 5. Electrical characteristics including data for motors and heaters.
- B. Service Agency List: Submit a complete list of local service agencies with the service and parts manuals for included manufacturers, complete with telephone numbers for all buy-out equipment installed.
- C. Provide video tapes for maintenance, training, operation, etc. where available from the manufacturer.

1.12 AS-BUILT/ RECORD DOCUMENTS:

- A. Maintain one record set of Food Service Equipment Plans with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation. Provide an "as-built" set in reproducible transparency form and electronic computer disk form.
- B. Provide one (1) final set of Product Data Submittal Manuals with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation as a specifications record set.
- C. These documents shall be provided on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner.
- D. Provide two (2) final complete set of Submittals to be retained by Architect as a Record Set.

1.13 SCHEDULE:

- A. General: Time is of the essence in this agreement. Acceptance constitutes a guarantee that the Kitchen Equipment Contractor (KEC) can and will obtain materials, equipment, and manpower to permit overall completion of the entire building project on schedule upon notice to proceed. The Kitchen Equipment Contractor (KEC) shall coordinate their work with the progress schedule, as prepared and updated periodically by the General Kitchen Equipment Contractor (KEC) or Construction Manager. The General Contractor and Kitchen Equipment Contractor shall have access to the existing equipment to disconnect, clean, relocate, and reinstall 1-2 weeks prior to substantial completion.
- B. The Kitchen Equipment Contractor (KEC) shall notify the Food Service Consultant and the Architect in writing of anticipated delays not within the realm of control of the Kitchen Equipment Contractor (KEC) immediately upon the Kitchen Equipment Contractor (KEC)'s realization that delays are imminent.
- C. The Kitchen Equipment Contractor (KEC) will not be granted relief for failure to meet schedules or failure of manufacturers to meet promised delivery dates unless the Kitchen Equipment Contractor (KEC) can establish, in writing, that orders were received by the manufacturer with reasonable lead times.
- D. The Kitchen Equipment Contractor (KEC) shall pay extra charges resulting from special handling or air shipment in order to meet the schedule if insufficient time was allowed in placing factory orders.

1.14 PRODUCT HANDLING:

- A. Delivery Of Materials: Deliver materials (except bulk materials) in manufacturer's containers fully identified with manufacturer's name, trade name, type, class, grade, size, color, power requirement, if any, and item number.
- B. Storage of Materials, Equipment and Fixtures: Kitchen Equipment Contractor (KEC) is responsible for receiving and warehousing of equipment and fixtures until ready for installation. The Kitchen Equipment Contractor (KEC) will store materials, equipment, and fixtures in sealed containers. They shall be stored off the ground and under cover, protected from damage.
- C. Handling Materials and Equipment: The Kitchen Equipment Contractor (KEC) will verify and coordinate conditions at the building site, particularly door and/or wall openings and passages to assure access for all equipment. Pieces too bulky for existing facilities shall be hoisted or otherwise handled with apparatus as required. All special handling equipment charges shall be arranged for and paid for by the Kitchen Equipment Contractor (KEC).

1.15 PRODUCT PROTECTION:

- A. The Kitchen Equipment Contractor (KEC) is responsible to protect their equipment against theft or damage during the progress of the project until final acceptance by the Owner. Items delivered to the job site at the Owner's or Contract Manager's request before the site is ready for installation should be signed for as approved by the Owner or Contract Manager.

- B. The Kitchen Equipment Contractor (KEC) will use all reasonable means to protect the materials of this Section before, during, and after installation and to protect the associated work and materials of the other trades.
- C. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment are not to be used for general storage by other trades and should be locked before leaving the site. Damage and theft resulting from the failure to secure boxes shall be repaired or replaced at the Kitchen Equipment Contractor (KEC)'s own expense. The Kitchen Equipment Contractor (KEC) shall be available, as needed, to open and secure walk-in boxes for the other trades to perform their work related to these walk-in boxes, within the other trades' schedules as not to delay their work.
- D. Kitchen Equipment Contractor (KEC) will verify if the flooring is to be acid washed. In the event of this type of cleansing, any equipment constructed of stainless steel shall not be delivered until a minimum of 24 hours after the final cleansing is completed.

1.16 WARRANTY:

- A. The Kitchen Equipment Contractor (KEC) is responsible to protect their equipment against theft or damage during the progress of the project until final acceptance by the Owner. Items delivered to the job site at the Owner's or Contract Manager's request before the site is ready for installation should be signed for as approved by the Owner or Contract Manager.
- B. The Kitchen Equipment Contractor (KEC) will use all reasonable means to protect the materials of this Section before, during, and after installation and to protect the associated work and materials of the other trades.
- C. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment are not to be used for general storage by other trades and should be locked before leaving the site. Damage and theft resulting from the failure to secure boxes shall be repaired or replaced at the Kitchen Equipment Contractor (KEC)'s own expense. The Kitchen Equipment Contractor (KEC) shall be available, as needed, to open and secure walk-in boxes for the other trades to perform their work related to these walk-in boxes, within the other trades' schedules as not to delay their work.
- D. Kitchen Equipment Contractor (KEC) will verify if the flooring is to be acid washed. In the event of this type of cleansing, any equipment constructed of stainless steel shall not be delivered until a minimum of 24 hours after the final cleansing is completed.

PART 2 - PRODUCTS (Not Applicable)

2.1 EQUIPMENT:

- A. Equipment schedule: Refer to schedule on Foodservice Drawings and Part 5 Itemized Specifications for equipment included in this Section.

2.2 MATERIALS:

A. Metals:

1. Stainless Steel: AISI Type 302/304, hardest workable temper, and No.4 directional polish. Standard gauges are noted in these specifications under Heading 2.04; Section B.1.
2. Galvanized Steel Sheet: ASTM A526, except ASTM A527 for extensive forming; ASTM A525, G90 zinc coating, chemical treatment.

Note: Where painted finish is indicated, provide mill phosphatized treatment in lieu of chemical treatment.

3. Steel Sheet: ASTM A569 hot-rolled carbon steel.
4. Galvanized Steel Pipe: ASTM A53 or ASTM A120, welded or seamless, schedule 40, galvanized.
5. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.

Note: Galvanized Finish (G.I.): ASTM A123 hot-dipped zinc coating, applied after fabrication.

6. Aluminum: ASTM B209B221 sheet, plate and extrusions (as indicated), alloy, temper and finish as determined by manufacture / fabricator, except 0.40-mil natural anodized finish on exposed work unless another finish is indicated.

B. Plastic Laminate: NEMA LD3, Type 2, 0.050" thick, except Type 3, 0.042" for post-forming smooth (non-textured). Color and texture as selected by the Architect/Interior Designer.

1. Comply with NSF Standard No. 35.
2. Veneered with approved waterproof and heat proof cement. Rubber base adhesives are not acceptable.
3. Applied directly over close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface; or commercial grade furniture particle board, Cortron or equal.
4. If specified plywood or particle board is unavailable, submit specifications and sample of alternate material for approval. If specified for a "wet" area, only marine grade wood products will be approved for these areas.
5. Exposed faces and edges shall be faced with 1/16 inch (1.6mm) thick material. Cover corresponding backs with approved backing and balancing sheet material. No unfinished exposed plywood/particle board will be acceptable.

C. Hardwood Work Surfaces: Laminated edge grained hard maple (*Acer saccharum*), NHLA First Grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded, and finished with NSF approved oil-sealer.

D. Solid Surface Material (SSM): Unless otherwise specified, provide 1/2" thick 100% homogeneous filled acrylic material meeting ANSI Z124.6 Type 6, as manufactured by DuPont Company and known as Corian. Color(s) and pattern(s) as selected by the Architect/ Interior Designer.

1. Comply with NSF Standard No. 51.

2. Acrylic adhesive shall be used for all joints.
3. Install directly over 3/4" thick (minimum) substrate of close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free surface or a commercial grade furniture particle board, Cortron or equal. Provide additional bracing and support as required by the SSM manufacturer.
4. Fabrication shall be by a fabricator trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Fabricator.
5. Installation shall be by an installer trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Installer.
6. All fabrication and installation of Corian and all components attached to or installed in or through Corian shall be in compliance with manufacturer's instructions and the DuPont Corian Food Service Guidelines and Design Manual. Of particular concern are the sections, details, and instructions on the installation of drop-in or built-in hot or cold components.
7. All other Solid Surface Material (SSM), which may be specified by others to be used in food service areas, must comply with NSF certification and ANSI Standard No. 51.

E. Insulation:

1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers, use urethane, rigid board foam or foamed-in-place, not less than 2 inches (50mm) thick, except that vertical surfaces of cold pans and ice bins may be 1 inch (25mm) thick. Insulation shall be bonded at joints to prevent condensation on exterior.
2. For refrigerated applications, such as fabricated undercounter refrigerators, use urethane rigid board foam or foamed-in-place, or Styrofoam rigid board foam 2 inches (50mm) thick, bonded at joints.
3. For heated type applications, such as plate warmers, use block type rock wool, minimum 1 inch (25mm) thick.
4. At counter tops, subject to heat from cooking equipment and refrigeration compressors, use 1-inch (25mm) thick B&Z Products (1-800-999-0890) Marinite I, or equal, to insulate underside of top.
5. Marinite material shall be added between freezer or refrigerator and 14 gauge (2.0) stainless steel top.
6. All insulation shall be fully encased or enclosed.

F. Joint Materials:

1. Sealants: 1-part or 2-part, polyurethane or silicone based, liquid elastomeric sealant, non-solvent release type, Shore A hardness of 30, except 45 if subject to traffic. Sealants shall be NSF Listed for use in food zones. Installation shall comply with applicable requirements of NSF Standards.
2. Backer Rod: 3/8 inch or larger joints shall be polyurethane rod stock, larger than joint width.
3. Gaskets: Solid or hollow (but not cellular) neoprene or polyvinyl chloride, light grey, minimum of 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

G. Paint and Coatings:

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with food service, durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with governing regulations for food service.
2. Galvanize Repair Paint: MIL-P-21035.
3. Sound Deadener: NSF listed sound deaden material such as latex sound deadener for internal surfaces of metal work and underside of metal counters and tables between work top and underbracing.
4. Pretreatment: SSPC-PT2 or PT3, of FS TT-C490.
5. Primer Coating for Metal: FS TT-P-86, type suitable for baking, where indicated.
6. Enamel for Metal: Synthetic type, FA TT-P-491, type suitable for baking, where indicated.

2.3 FABRICATED PRODUCTS:

A. Hardware:

1. General: Manufacturer's standard, but not less than ANSI 156.9 Type 2 (Institutional), satin finish stainless steel or dull chrome finish on brass, bronze, or steel.
2. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty NSF approved hinges with Component Hardware Group, Model No. P62-1010 pulls, or equal. Catches shall be heavy-duty magnetic type, except as otherwise indicated.
3. Drawer Hardware: Slides to be 200 pounds minimum capacity per pair, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball bearings and positive stops, Component Hardware Group Series S52, or equal. Pulls shall be Component Hardware Group, Model No. P62-1 012, or equal.
4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers in 14-gauge (2.0mm) stainless steel overhead tracks, and be removable without the use of tools. Bottom of cabinet shall have stainless steel guide-pins and not channel tracks for doors.
5. All hardware shall be identified with manufacturer's name and number so that broken or worn parts may be replaced.

B. Casters:

1. Type and size as recommended by caster manufacturer, NSF approved for the type and weight of equipment supported, but not less than 5-inch (127mm) diameter heavy-duty, ball bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane tire, unless otherwise specified. Minimum width of tread shall be 1-3/16 inch (30mm). Minimum capacity per caster shall be 250 pound (113.4kg), unless otherwise noted in itemized specifications.
2. Provide solid material wheels with stainless steel rotating wheel guard.
3. To be sanitary, provide sealed wheel and swivel bearings and polished plated finish per NSF.
4. Unless otherwise indicated, equip each item with two (2) swivel-type casters and two (2) fixed casters. Provide foot brakes on two (2) casters on opposite front corners of equipment.
5. Unless equipment item is equipped with another form of all-around protective bumper, provide circular rotating bumper above each caster, 5-inch (127mm) diameter tire of light grey synthetic rubber (hollow or closed-cell) on cadmium-plated disc.

C. Plumbing Fittings, Trim and Accessories:

1. General: Where exposed or semi-exposed, provide bright chrome plated brass or polished stainless steel units. Provide copper or brass where not exposed.
2. Vacuum Breakers: Provide with food service equipment as listed in the itemized specifications.
3. Water Outlets: At sinks and at other locations where water is supplied (by manual, automatic or remote control), furnish commercial quality faucets, valves, dispensers or fill devices of the type and size indicated and as required to operate as indicated.
4. Waste Fittings: Except as otherwise indicated, furnish 2-inch (50mm) remote-lever waste valve and 3-1/2 inch (89mm) strainer basket.

D. Electrical Materials:

1. General: Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected and installed in accordance with NEMA standards and recommendations and as required for safe and efficient use and operation of the food service equipment without objectionable noise, vibration and sanitation problems.
2. Before ordering equipment, confirm pertinent electrical requirements with the serving electrical utility, such as actual voltages available, number of phases and number of wires in the system.
3. Wire electrical work for fabricated equipment completely to a junction or pull box which is wholly accessible and mounted on the equipment. Wiring shall be labeled for outlet or item served. Verify local requirements for UL Listing on complete assembly, and provide if required.
4. Components shall bear the UL label or be approved by the prevailing authority.
5. Provide Custom fabricated refrigerator units with vapor tight light receptacles, shatterproof lamps and automatic switches. Conceal wiring.
6. Controls and Signals: Provide recognized commercial grade signals, on-off push buttons or switches, and other speed and temperature controls as required for operation, complete with pilot lights and permanent signs and graphics to assist the user of each item. Provide stainless steel cover plates at control and signal electrical boxes. Locate controls and switches out of heat zones, in easily accessible locations that preclude accidental contact by employees.
7. Internal Wiring of Fixtures and Equipment:
 - a. The Kitchen Equipment Contractor (KEC) shall be responsible for internal wiring of electrical devices built into or forming an integral part of fabricated equipment items. Wiring will be in metal conduit, connected to an accessible pull-box or j-box, and tagged for intended use. Refer to Section 26 Specifications for color coding of wiring.
 - b. Each standard item shipped in sections shall be properly connected internally and verified by the Kitchen Equipment Contractor (KEC).
 - c. Furnish dish washers and conveyors internally wired to junction box or distribution panel as specified, including push button switches, motors, immersion heaters, solenoids, etc.
 - d. Where light fixtures are specified or detailed as part of counters, furnish and install cases or fixtures, light fixtures, lamps and shields. Provide warm white lamps unless otherwise specified. If fluorescent light fixtures are specified, provide ballasts and include shields. Provide shields for all light fixtures.

- e. Wiring for built-in strip heaters or immersion-type elements shall be provided as follows:
 - 1) In heat zone: shall have UL approved insulation and be not less than 300-volt rated heat resistant insulation with nickel wire.
 - 2) Connection wiring extended in raceway or conduit to junction or pull box shall be not less than 600 volt rated heat resistant insulation covered wire, UL approved, or equal.
 - f. Wiring for fabricated refrigerator and freezer cabinets shall be UL approved insulated cable from exterior junction box to internal components, within insulation unless code requires metallic conduit:
 - 1) Conduit shall be Electrical Metallic Tubing, rigid or flexible (Greenfield). For freezer applications, Seal-Tite Flex or approved equal shall be used.
 - 2) Internal wiring shall be UL approved rubber covered 600 volt rated conductor, except door heaters, which shall be Nichrome wire with silicone braided jacket, having resistance of 10.4 watts per lineal foot.
 - 3) Mount convenience outlets, lighting receptacles, (rubber or porcelain) and door switches in approved boxes. Convenience outlets for evaporators shall be twist lock type. Solid connections, as for freezer evaporators, shall be made vapor tight.
 - g. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal -Tite conduit equal to Anaconda type "UA". UL approved, complete with approved liquid tight connectors on each end, and designed to provide electrical grounding continuity.
 - h. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid tight type, with threaded hubs.
8. Convenience and Power Outlets:
- a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures, complete with wiring, conduit, outlet and stainless-steel cover plate.
 - b. Outlets and plugs shall conform to NEMA standards.
 - c. Electrical outlets and devices shall be first quality "Specification Grade".
 - d. Furnish GFCI outlets where adjacent to sink compartments, as per the National Electrical Code.
9. Plugs and Cords: Where cords and plugs are provided, they shall comply with National Electrical Manufacturer's Association (NEMA) requirements. Indicate NEMA configuration for each applicable item.
10. Heating Equipment:
- a. Install electric and heating equipment as to be readily cleanable or removable for cleaning.
 - b. Steam heated custom fabricated equipment shall be a self-contained assembly, complete with control valves located in an accessible position.

11. Motors: Totally enclosed type, except drip-proof type where not exposed to a dust or moisture condition; ball bearings, except sleeve bearings on small timing motors; windings impregnated to resist moisture; horse-power and duty-cycle ratings as required for the service indicated.
12. Power Characteristics: Refer to Division 26 specifications for project power characteristics. Also, refer to individual equipment requirements, for loads and ratings.

2.4 FABRICATION OF METAL WORK:

A. General Fabrication Requirements:

1. Remove burrs from sheared edges of metalwork, ease the corners and smooth to eliminate cutting hazard. Bend sheets of metal, at not less than the minimum radius required to avoid grain separation in the metal. Maintain flat, smooth surfaces, without damage to finish.
2. Reinforce metal at locations of hardware, anchorages and accessory attachments wherever metal is less than 14-gauge (2.0mm), or requires mortised application. Conceal reinforcements to the greatest extent possible. Weld in place, on concealed faces.
3. Exposed screws or bolt heads, rivets and butt joints made by riveting straps under seams and then filled with solder, will not be accepted. Where fasteners are permitted, provide Phillips head, flat or oval head machine screws. Cap threads with acorn nuts, unless fully concealed in inaccessible construction; and provide nuts and lock washers unless metal for tapping is at least 12-gauge (2.5mm). Match fastener head finish with finish of metal fastened.
4. Where components of fabricated metal work are indicated to be galvanized, and involve welding or machining of metal heavier than 16-gauge (1.6mm), complete the fabrication and provide hot-dip galvanizing of each component, after fabrication, to the greatest extent possible (depending upon available dip-tank sizes). Comply with ASTM A123.
5. Welding and Soldering:
 - a. Materials 18-gauge (1.27mm), or heavier, shall be welded.
 - b. Seams and joints shall be shop welded or soldered as the nature of the material may require.
 - c. Welds must be ground smooth and polished to match original finish.
 - d. Where galvanizing has been burned off, the weld shall be cleaned and touched up with high grade aluminum paint.
6. Provide removable panels for access to mechanical and electrical service connections, which are concealed behind or within foodservice equipment, but only where access is not possible and not indicated through other work.
7. Closures: Where ends of fixtures, splash back's, shelves, etc., are open, fill by forming the metal, or welding sections, if necessary, to close entire opening flush to walls or adjoining fixtures.
8. Rolled Edges: Rolled edges shall be as detailed, with corners bull nose, ground and polished.
9. Coved Corners: Stainless steel foodservice equipment shall have 1/2 inch (13mm) or larger radius coves in horizontal and vertical corners, and intersections, per N.S.F. standards.

B. Metal and Gauges:

1. Except as otherwise indicated, fabricate exposed metalwork of stainless steel; and fabricate the following components from the gauge of metal indicated, and other components from not less than 20-gauge (0.8mm) metal:
 - a. Table and counter tops: 14 gauge.
 - b. Sinks and drain boards: 14 gauge.
 - c. Shelves: 16 gauge.
 - d. Front drawer and door panels: 18 gauge (double pan construction).
 - e. Single pan doors and drawer fronts: 16 gauge.
 - f. Enclosed base cabinets: 18 gauge.
 - g. Enclosed wall cabinets: 18 gauge.
 - h. Exhaust hoods and ventilators: 18 gauge.
 - i. Pan-type insets and trays: 16 gauge.
 - j. Removable covers and panels: 18 gauge.
 - k. Skirts and enclosure panels: 18 gauge.
 - l. Closure and trim strips over 4" wide: 18 gauge.
 - m. Hardware reinforcement: 12 gauge.
 - n. Gusset plates: 10 gauge.

C. Work-Surface Fabrication:

1. Fabricate metal work surfaces by forming and welding, to provide seamless construction; using welding rods matching sheet metal, grinding and polishing. Where necessary for disassembly, provide waterproof gasketed draw-type joints with concealed bolting.
2. Reinforce work surfaces 30 inches on center both ways, with galvanized or stainless steel concealed structural members. Reinforce edges, which are not self-reinforced, by formed edges.

D. Metal Top Construction:

1. Metal tops shall be one-piece welded construction, including field joints. Secure to a full perimeter galvanized steel channel frame cross-braced not farther than 2'-6" (760mm) on center. Fasten top with stud bolts or tack welds. If hat sections are used in lieu of channels, close ends.
2. Properly designed draw fastening, trim strip, or commercial joint material to suit requirement shall be used, only if specified.

E. Structural Framing:

1. Except as otherwise indicated, provide framing of minimum 1-inch (25mm) pipe-size round pipe or tube members, with mitered and welded joints and gusset plates, ground smooth. Provide 14 gauge (2.0mm) stainless steel tube for exposed framing, and galvanized steel pipe for concealed framing.
2. Where indicated, flange rear and end edges up to form splashes integrally with top, with vertical and horizontal corners coved of not less than 1/4-inch (6mm) radius, die formed. Turn back splashes 1 inch to wall across top and ends with rounded edge on break, unless otherwise specified.

3. For die-crimped edges, use inverted "V" 1/2 inch (13mm) deep inside and 2 inch (38mm) deep on outside, unless otherwise shown. For straight down flanges, make 1- 3/4 inch (45mm) deep on outside. For bull nose edges, roll down 1-3/4 inch (45mm).
 4. Edges: die-formed, integral with top. For rounded corners, form to 1-inch radius, weld, and polish to original finish.
- F. Field Joints: For any field joint required because of size of fixture; butt-joint, reinforce on underside with angles of same material, bolt together with non-corrosive bolts and nuts, field weld, grind and polish.
- G. Pipe Bases: Construct pipe bases of 1-5/8-inch (41mm) diameter 18 gauge (1.2mm) stainless steel tubing. Fit legs with polished stainless steel sanitary adjustable bullet feet to provide for adjustment of approximately 1-1/2 inch (38mm), without exposing threads. Space legs to provide ample support for tops, precluding any possibility of buckling or sagging and in no case more than 6'-0" centers.
- H. Legs and Cross-rails
1. Equipment legs and cross rails shall be 1-5/8 inch (41mm), 16-gauge (1 .59mm) stainless steel tubing.
 2. Welds at cross rails shall be continuous and ground smooth. Please note; tack welds are not acceptable.
 3. Bottom of legs shall be cambered inward and fitted with a stainless-steel bullet-type foot with not less than 2 inch (50mm) adjustment. Flanged feet with bolt holes may be required dependent on design applications. Provide proper type feet in compliance with local codes. Stainless steel to be used in all applications.
 4. Free standing legs shall be pegged to floor with 1/4 inch (6mm) stainless steel rod.
 5. Components:
 - a. Stainless Steel Gusset: Stainless steel exterior to fit 1-5/8-inch (41mm) tubing, with Allen screw for fastening and adjustment. Not less than 3 inches (76mm) diameter at top and 3-3/4-inch (95mm) long. Outer shell 16-gauge (1.6mm) stainless steel, reinforced with 12-gauge (2.5mm) mild steel insert welded interior shell, or approved equal.
 - b. Stainless Steel Low Counter Legs: Stainless steel exterior 5-3/4-inch (146mm) minimum, 7 inch (1 78mm) maximum length with stainless steel 3- 1/2 inch (89mm) square plate with four counter-sunk holes, welded to top for fastening.
 - c. Stainless Steel Adjustable Foot: Stainless steel 1-1/2-inch (38mm) diameter tapered at bottom to 1 inch (25mm) diameter, fitted with threaded cold rolled rod for minimum 1-1/2 inch (38mm) diameter x 3/4 inch (19mm) threaded bushing plug welded to legs, or approved equal. Push-in foot not acceptable.
 6. Legs shall be fastened to equipment with gussets, as follows:
 - a. Sinks: Reinforced with bushings and set screw.
 - b. Metal Top Tables and Dish Tables: Welded to galvanized steel channels, 14-gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
 - c. Wood Top Tables: Welded to stainless steel channels, 14-gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.

I. Shelves:

1. Construct solid shelves under pipe base tables of 16-gauge stainless steel, with 1-1/2 inch turned down and under edges on exposed sides, and 2 inch turn up against walls or equipment. Fully weld to pipe legs.
2. In fixtures with enclosed bases, turn up shelves on back and sides with 1/4-inch (6mm) (minimum) radius and feather slightly to ensure a tight fit to enclosure panels.

J. Sinks:

1. Construct sinks of 14-gauge stainless steel with No.4 finish inside and outside.
2. Form back, bottom and front of one piece, with ends and partitions welded into place. Partitions: double thickness, 1-inch minimum space between walls. Multiple compartments shall be continuous on the exterior, without applied facing strips or panels.
3. Cove interior vertical and horizontal corners of each tub not less than 1/4-inch radius, die formed. Outer ends of drain boards to have roll rim risers not less than 3 inches high.
4. Drill faucet holes in splashes 2-1/2 inches below top edge. Verify center spacing with faucet specified.
5. Sink insets shall be deep drawn of 16-gauge (1 .59mm), or heavier, polished stainless steel. Weld into sink drain boards with 1-1/2-inch x 1-1/2-inch x 14-gauge stainless steel angle brackets; securely welded to sinks and galvanized cross angles spot welded to underside of drain boards to form an integral part of the installation.
6. The bottom of each compartment shall be creased such as to ensure complete drainage to waste opening. Slope bottom of sink bowls toward outlet.

K. Drains, Wastes and Faucets:

1. Furnish and install T&S Brass faucets model B-3940-01 stainless steel rotary drain assembly with connected overflow assembly, in die-drawn inset type sinks and bain-marie sinks.
2. Other custom fabricated sinks shall be furnished with T&S Brass faucets model B3940-01 stainless steel rotary drain assembly, with STAINLESS STEEL cap nut over overflow outlet. Waste connection shall have 2 inch (50mm) external thread size, with 1-1/2 inch (38mm) internal thread size.
3. Rotary Handle: Of sufficient length to extend to front edge of sink. No riveting, screws or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement. Rotary handle bracket to be provided as part of the sink fabrication.
4. Water pans for steam tables shall be fitted with 1-inch (25mm) drains with chrome-plated brass stand pipes.
5. All faucets furnished with equipment included in this Section shall be lead free and comply with NSF Standard #61, Section #9; such as manufactured by Fisher, Chicago, or T&S. Where the itemized specifications list a faucet by manufacturer and model, the Kitchen Equipment Contractor (KEC) shall verify that the listed faucet complies with this requirement.
6. If the listed faucet does not comply, the Kitchen Equipment Contractor (KEC) shall submit similar model which does comply, from the same manufacturer where available or from one of the above manufacturers.

L. Workmanship:

1. Best quality in the trade. Field verify dimensions before fabricating; conform all items to dimensions of building; neatly fit around pipes, offsets and other obstructions.
2. Fabricate only in accordance with approved shop drawings, showing pipes, obstructions to be built around, and location of utilities and services.

M. Enclosures:

1. Provide enclosures, including panels, housings, and skirts for service lines, operating components and mechanical and electrical devices associated with the foodservice equipment, except as specifically indicated to be "open".
2. Where equipment is exposed to customer view, provide enclosure of service lines, operating components and mechanical and electrical devices.

N. Casework:

1. Enclosure: except as otherwise indicated, provide each unit of casework (base, wall, overhead and free-standing) with a complete-enclosure metal cabinet, including fronts, backs, tops, bottoms, and sides.
2. Bases shall be made of 18-gauge (1.27mm) stainless steel sheets reinforced by forming the metal.
3. Ends, partitions and shelves are stainless steel.
4. Unexposed backs and structural members are galvanized.
5. Vertical ends and partitions are single wall, with a 2 inch (50mm) face.
6. Sides and through partitions are flush with bottom rail, welded at intersections.
7. Shelves: Provide adjustable standards for positioning and support of shelves in casework; except bottom shelf of cabinet mounted on legs or as specified. Turn back of shelf units up 2 inches, and hem. Turn other edges down to form open channel. Reinforce shelf units to support 40 pounds per square foot loading, plus 100 percent impact loading.
8. Bottom front rail of bases set on masonry platform shall be continuously closed and sealed to platform.

O. Doors:

1. Metal doors shall be double-cased stainless steel. Outer pans shall be 18-gauge (1.27mm) stainless steel with corners welded, ground smooth and polished. Inner pan shall be 20-gauge (.95mm) stainless steel fitted tightly into outer pan with a sound-deadening material such as Celotex or Styrofoam used as a core. The two pans shall be tack welded together and joints solder filled. Doors shall finish approximately 3/4 inch (19mm) thick, and be fitted with flush recessed type stainless steel door pulls.
2. Wood doors shall be fabricated as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated.
3. Hinged doors shall be mounted on heavy-duty N.S.F. approved hinges, or as noted on plans or specifications.

P. Drawer Assemblies:

1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing.

2. Slide assembly consists of one pair of 200 pound stainless steel roller bearing extension slides, with side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides and stainless steel front.
 3. Drawer bodies for general storage are to be 20 inches x 20 inches (508mm x 508mm), with 18 gauge stainless steel containers.
 4. Drawers intended to hold food products shall be removable type with 12 x 20 (305mm x 508mm) stainless steel food pans, in a stainless steel assembly.
 5. Drawer fronts are double cased, 3/4 inch (19mm) thick, with 18 gauge (1.27mm) stainless steel welded and polished front pan. Steel back pan is tightly fitted and tack welded. Sound deaden with rigid insulation material.
 6. Provide drawers with replaceable soft neoprene bumpers or for refrigerated drawers, a full perimeter soft gasket.
- Q. Closed Base: Where casework is indicated to be located on a raised-floor base, prepare casework for support without legs, and for anchorage and sealant application, as required for a completely enclosed and concealed base.
- R. Support from Floor: Equip floor supported mobile units with casters, and equip items indicated as roll-out units, with manufacturer's standard one-directional rollers. Otherwise, and except for closed-base units, provide pipe or tube legs, with adjustable bullet-design feet for floor supported items of fabricated metalwork. Provide 1-1/2 inch adjustment of feet (concealed threading).
- S. Shop Painting:
1. Clean and prepare metal surfaces to be painted; remove rust and dirt. Apply treatment to zinc coated surfaces, which have not been mill phosphatized. Coat welded and abraded areas of zinc coated surfaces, with galvanize repair paint.
 2. Apply 1.5 mil (dry film thickness) metal primer coating, followed by 2, 1.0 mil (dry film thickness) metal enamel finish coatings.
 3. Bake primer and finish coatings in accordance with paint manufacturer's instructions for a baked enamel finish.
- T. Sound Deadening:
1. Sound deaden underside of metal tops, drain boards, under shelves, cabinet interior shelves, etc., above the underbracing/reinforcing/framing only.
- 2.5 FILTER EXHAUST HOODS, WATER WASH VENTILATOR FABRICATION AND ULTRAVIOLET:
- A. Filter Exhaust Hoods:
1. 18 Gauge type 304 stainless steel external welded construction, in accordance with the latest edition of NFPA No.96, including all applicable appendices. Exposed welds to be ground and polished.
 2. Grease Removal: UL classified, non-adjustable, stainless steel grease filters with drip-channel gutters, drains and collection basins.
 3. Light Fixtures: Furnish type of fixture specified. Fixtures shall be UL listed for hoods, NSF approved, with sealed safety lenses and stainless steel exposed conduit for wiring.

4. Exhaust Duct: Furnish welded stainless steel formed duct collars at ceiling or wall duct connections, where exposed. Furnish exposed to view ductwork as specified. Verify size and location of duct connections required in this contract, before fabrication. Other ductwork will be by the Mechanical Section.
5. Fire Extinguishing System: Pre-piped liquid chemical or water fire suppressant system, as specified, complying with applicable local and NFPA regulations. Wet chemical fire suppression systems shall comply with UL 300 Standards.

2.6 REFRIGERATION EQUIPMENT:

A. General:

1. Furnish either single or multiple compressor units, as specified or recommended by the manufacturer for the sizes and variations between connected evaporator loads as indicated.
2. Furnish units of the capacities indicated, arranged to respond to multiple-evaporator thermostats and defrosting timers. Include coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment and complete automatic control system.
3. Refrigerant: Pre-charge units with type or types recommended by manufacturer for services indicated, with quick-disconnect type connections where specified, ready to receive refrigerant piping runs to evaporators and (where remote) to condensers. All refrigerant and associated components shall comply with the requirements of the Montreal Protocol Agreement. No CFC refrigerants or associated components shall be allowed on this Project. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date, and intermediate replacement refrigerants are to be used only when HFC refrigerants are not available. Kitchen Equipment Contractor (KEC) shall be responsible for coordinating with manufacturers. Provide refrigerant leak monitoring devices where required by federal, state, or local codes.
4. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, or as applicable for extreme low local conditions. The maximum indoor design temperature for operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall be determined with prevailing conditions at mounting location(s) of compressor(s), such as sun exposure, limited ventilation, high fences/walls, roof color and materials, local climatic extremes, etc., but in no case, shall it be less than 100 degrees Fahrenheit.

B. Components:

1. Coils: Coils for fabricated refrigerators shall have vinyl plastic coatings, stainless steel housings and shall be installed in such a manner as to be replaceable.
2. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator.
3. Thermometers:
 - a. Fabricated refrigerated compartments to be fitted minimally with a flush dial thermometer, with chrome plated bezels and to be provided as specified.
 - b. Thermometers shall be adjustable and shall be calibrated after installation.
 - c. Thermometers shall have an accuracy of ± 2 degrees Fahrenheit (1 degree Centigrade).

4. Hardware:
 - a. Refrigerator hardware for fabricated refrigerator compartments shall be heavy-duty components.
 - b. Self closing hinges.
 - c. Latches to be magnetic edge mount type, unless specified or detailed otherwise.
5. Locks:
 - a. Doors and drawers for walk-in coolers/freezers and reach-in refrigerated compartments, both fabricated and standard, shall be fitted with cylinder locking type latches and provided with master keys.

C. Cold Pans: Ice pans, refrigerated pans and cabinets shall be provided with breaker strips, where adjoining top or cabinet face materials, to prevent transfer of cold.

D. All open top mechanically cooled custom fabricated or standard buy-out refrigerators and/or cold pans shall comply with NSF Standard #7 requirements, as of April 1, 1998. The Kitchen Equipment Contractor (KEC) shall verify that the specified unit complies with this requirement or submit a similar model, which does comply, from the same manufacturer where available.

E. Ventilation of Refrigerated Equipment:

1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit.
2. If, in the opinion of the Kitchen Equipment Contractor (KEC), additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated or remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect for evaluation and direction.

2.7 MISCELLANEOUS MATERIALS:

A. Nameplates: Whenever possible, locate nameplates and labels on manufactured items, in accessible position, but not within customer's normal view. Do not apply name-plates or labels on custom fabricated work, except as required for compliance with governing regulations, insurance requirements, or operator performance.

B. Manufactured Equipment Items: Furnish items as scheduled or herein specified. Verify dimensions, spaces, rough-in and service requirements, and electrical characteristics before ordering. Provide trim, accessories and miscellaneous items for complete installation.

C. Insert Pans:

1. General: Provide cut-outs, openings, drawers, or equipment specified or detailed to hold stainless steel insert pans with a full complement of pans as follows:
2. One (1) stainless steel, 20-gauge (0.95mm) minimum, solid insert pan for each space, sized per plans, details, or specifications.
3. Where pan sizes are not indicated in plans, details, or specifications, provide one full-size pan for each opening.

4. Provide maximum depth pan to suit application and space.
 5. Provide 18-gauge (1.27mm) removable stainless steel adapter bars where applicable.
 6. Provide all cut-outs and openings or equipment specified or detailed to hold stainless steel insert pans with a hinged stainless steel removable night cover.
- D. Tray Slides: Before fabrication of counters with tray slides, verify:
1. Size and shape of tray. Edge of tray shall not overhang outer support/slider by more than 2". If edge of tray exceeds this dimension, notify Architect, in writing, for evaluation and adjustment, if necessary.
 2. Configuration of corners, turns, and shape of tray slides for proper support and safe guidance of trays.
 3. Tray slide capable of supporting 200 pounds per linear foot, live load.
- E. Self-leveling dispensers: Verify type and make of ware, dimensions and weight, request samples from Operator and submit to the dispenser manufacturer for proper sizing and calibration of dispensers.
- F. Carbon dioxide (co') equipment: Where equipment requires connection with compressed co' cylinder for operation, provide proper sized cylinder manifold and control system (integral with equipment) with proper connectors for Department of Transportation (DOT) approved type cylinders, complete with cylinder safety devices and supports.
- G. Reasonable quietness of operation of equipment is a requirement. The Kitchen Equipment Contractor will be required to replace or repair any equipment producing out-of-the-ordinary intolerable noise. This also includes providing and installing bumpers and gaskets for doors and drawers on fabricated and standard manufactured items and sound insulation where feasible.

2.8 ITEMIZED SPECIFICATIONS

- A. Refer to the following pages for specific specification information on each item included in this Section.

ITEM 1 WALK-IN COLD STORAGE ROOMS: 2 REQUIRED

- A. Imperial Manufacturing, modular sandwich panel design Foam-A-Lite *H011 cold storage rooms complete in configuration shown on Sheet FS1.01. Each room shall incorporate the following:
1. Provide two 60" x 96" horizontal single electric sliding doors and door frames (heated for freezer) 22-gauge stainless steel inside and out (no wood construction) with 14" x 14" glass window (heated for freezer), and 36" high 1/8" thick aluminum diamond treadplate interior and exterior kick plates. Include stainless steel cover for door track and electric operator. Provide with manual lock hasp. Include doors with ICC-5 Operator for Owner furnished card reader software.
 2. Exposed exterior wall panels and closure panels/trim strips to adjacent walls and ceiling shall be 20-gauge Type 304, No. 4 finish stainless steel. Exposed interior shall be .040 stucco embossed aluminum except ceiling which shall be .040 aluminum with white acrylic finish. Unexposed surfaces shall be 26-gauge galvanized steel.
 3. Finished exterior height of 9'-0". All insulation shall be 4" thick foamed in place, Class 1, urethane insulation excluding floor insulation which shall be 6" thick R-Max board stock urethane.

4. Install surface mounted 4-1/2" diameter dial thermometers above each door.
5. Install floor in floor depression complete with insulation noted above and vapor barrier of 15 lb. felt protective slip sheet applied over insulation and flashed up height of cove and joints lapped 6 inch minimum. Refer to Architectural Room Finished Schedule for wearing floor and base material inside and out by Division 9.
6. Kason #1825 heated vacuum vent for freezers.
7. Provide 3/8-inch diameter nylon coil hangers mounted on 3 inch by 3 inch aluminum plates with nuts and retainers to support evaporators hung from ceiling panel.
8. Furnish penetrations to accommodate all electrical, plumbing, and refrigeration lines. Furnish stainless steel escutcheons.
9. Provide Kason 1810 LED cooler and freezer ceiling light fixtures as noted on Sheet FS1.04. Field connections under Division 26 Electrical Contractor. Include lamps.
10. Provide flush mount, press type, switches with constant burning light and weather-proof covers mounted inside and outside of each room as indicated on electrical plan.
11. All electrical conduits shall be run concealed within the walk-in walls or above the ceiling panels.
12. Interior and exposed exterior seismic tie-downs at floor and ceiling level as required by codes.
13. Field verify all dimensions before submittals are issued.

B. Refer to Sheet FS2.01 for additional requirements and details.

C. Walk-ins shall be installed by this manufacturer or this manufacturer's certified installer only with a minimum of 5 years experience.

ITEM 2 REFRIGERATION SYSTEMS: 7 REQUIRED

A. System A: Walk-In Freezer @ -0°F to -10°F

1. Evaporators: Two (2) Larkin LCE6180BBEC-B; 18,000 BTU at -15°F suction temperature. Include expansion valve and drier-strainer.
2. Condensing Units: Two (2) Larkin LZS045L6C; 18,300 BTU at +90°F ambient air temperature.

B. System C: Walk-In Meat/Dairy Thaw Cooler @ +35°F to +40°F

1. Evaporator: Larkin LCA6135ABEC-B; 13,500 BTU at +25°F suction temperature. Include expansion valve and drier-strainer.
2. Condensing Unit: Two (2) Larkin LZS030M6C; 28,630 BTU at +90°F ambient air temperature.

C. System D: Produce Cooler @ +35°F to +40°F

1. Evaporator: Larkin LCA6135ABEC-B; 13,500 BTU at +25°F suction temperature. Include expansion valve and drier-strainer.
2. Condensing Unit: Larkin LHS015X6C; 15,500BTU BTU at +90°F ambient air temperature.

- D. System E: Walk-in Finishing Cooler @ +35F° to +40F°
1. Evaporators: Two (2) Larkin LCA6260ABEC-B; 26,000 BTU at -15F° suction temperature. Include expansion valve and drier-strainer.
 2. Condensing Units: Two (2) Larkin LZS030M6C; 28,630 BTU at +90F° ambient air temperature.
- E. System G: Blast Chillers @ -5°F to -10°F
1. Evaporators: Furnished with the Blast Chiller.
 2. Condensing Units: Three (3) Larkin LDT1000L6C; 82,100 BTU at +90F° ambient air temperature.
- F. System G: Blast Chiller @ -5°F to -10°F
1. Evaporators: Future Equipment.
 2. Condensing Units: Future Equipment.
- G. Each system shall incorporate the following:
1. Flexible vibration eliminator in suction line.
 2. Circuit breaker, automatic starting switch, motor protectors and pressure limit switch; all enclosed with interconnecting wire installed in a junction box ready for line connections.
 3. Liquid line sight glasses.
 4. Liquid line dehydrator filter of ample capacity.
 5. Suction line filter of ample capacity.
 6. Solenoid valve.
 7. Thermostat set to cut-in at -5F° and cut-out at -10F° for freezers. Cut-in at +38F° and cut-out at +40F° for refrigerator.
 8. Suction pressure regulator.
 9. Crank case heater.
 10. Refrigerant Lines: Hard copper "L" with "Silfos" brazed joints. Use refrigeration service tubing.
 11. Full charge refrigerant oil.
 12. Condensing units are located in the second-floor mechanical room. Verify exact location on Architectural plans.
 13. Install Beacon System control boxes in kitchen office as shown.
- H. Where refrigerant suction lines are trapped, use next size smaller pipe in vertical portion of the trap than that indicated so as to acquire sufficient gas velocity for proper oil return.
- I. Provide anti-sweat pipe covering of 3/4" Armstrong Armaflex or equivalent for suction lines from evaporator to condensing unit.
- J. Provide painted 1" drain tubing from evaporators to nearest indirect drain as shown on Sheets FS1.02. Trap at outlet end.
- K. Provide Raychem, model H611250 heating cable with H900 power connection to wrap all drain lines running through freezers

- L. Evaporators and condensing units as shown on the Contract Documents shall be installed under the supervision of a licensed Refrigeration Contractor subject to review by the Consultant.
- M. Provide testing, charging, adjusting, operational testing, and cleaning of equipment and lines.

ITEM 3 WALK-IN KITCHEN FREEZER SHELVING: 1 LOT REQUIRED

- A. Owner furnished and installed.

ITEM 4 WALK-IN COOLER DUNNAGE RACKS: 4 REQUIRED

- A. Owner furnished and installed.

ITEM 5 WALK-IN THAW ROOM SHELVING: 1 LOT REQUIRED

- A. Owner furnished and installed.

ITEM 6 MOBILE QUEEN MARY SHELVING: 30 REQUIRED

- A. (7) are existing equipment.
- B. Provide (23) Eagle Group, model QM2977-5-SR/D *H011.

ITEM 7 CORNER/CHANNEL GUARDS: 1 LOT REQUIRED

- A. Fabricate as detailed and construct vertical corner/channel guards and low wall caps of one piece all welded 14-gauge stainless steel. Install in locations shown on Sheet FS1.01. Install with stainless steel screws.
- B. Seal guards to walls and at joints as required.

ITEM 8 NOT USED

ITEM 9 NOT USED

ITEM 10 WALK-IN PRODUCE COOLER SHELVING: 1 LOT REQUIRED

- A. Owner furnished and installed.

ITEM 11 WALK-IN COLD STORAGE ROOMS: 2 REQUIRED

- A. Imperial Manufacturing, modular sandwich panel design Foam-A-Lite *H011 cold storage rooms complete in configuration shown on Sheet FS1.01. Each room shall incorporate the following:
 - 1. Provide two cooler walk-in doors and door frames 48-inch x 78-inch stainless steel inside and out with 14 inch x 14 inch insulated glass window and 36" high 1/8" polished aluminum diamond treadplate interior and exterior kick plates. Door hinged as shown on plan. Include Kason #944 deadbolt mortise lockset with interior safety release, Kason #1229 chrome pull handle, Kason #1094000013 concealed mounting door closer, and three Kason #1248 chrome spring assisted hinges. Hinge door as shown on plans.

2. Provide two 60" x 96" horizontal single electric sliding doors and door frames (heated for freezer) 22-gauge stainless steel inside and out (no wood construction) with 14" x 14" glass window (heated for freezer), and 36" high 1/8" thick aluminum diamond treadplate interior and exterior kick plates. Include stainless steel cover for door track and electric operator. Provide with manual lock hasp.
3. Exposed exterior wall panels and closure panels/trim strips to adjacent walls and ceiling shall be 20-gauge Type 304, No. 4 finish stainless steel. Exposed interior shall be .040 stucco embossed aluminum except ceiling which shall be .040 aluminum with white acrylic finish. Unexposed surfaces shall be 26-gauge galvanized steel.
4. Finished exterior height of 9'-0". All insulation shall be 4" thick foamed in place, Class 1, urethane insulation excluding floor insulation which shall be 6" thick R-Max board stock urethane.
5. Install surface mounted 4-1/2" diameter dial thermometers above each door.
6. Install floor in floor depression complete with insulation noted above and vapor barrier of 15 lb. felt protective slip sheet applied over insulation and flashed up height of cove and joints lapped 6 inch minimum. Refer to Architectural Room Finished Schedule for wearing floor and base material inside and out by Division 9.
7. Provide 3/8-inch diameter nylon coil hangers mounted on 3 inch by 3 inch aluminum plates with nuts and retainers to support evaporators hung from ceiling panel.
8. Furnish penetrations to accommodate all electrical, plumbing, and refrigeration lines. Furnish stainless steel escutcheons.
9. Provide Kason 1810 LED ceiling light fixtures as noted on Sheet FS1.04. Field connections under Division 26 Electrical Contractor. Include lamps.
10. Provide flush mount, press type, switches with constant burning light and weather-proof covers mounted inside and outside of each room as indicated on electrical plan.
11. All electrical conduits shall be run concealed within the walk-in walls or above the ceiling panels.
12. Interior and exposed exterior seismic tie-downs at floor and ceiling level as required by codes.
13. Field verify all dimensions before submittals are issued.

B. Refer to Sheet FS2.01 for additional requirements and details.

C. Walk-ins shall be installed by this manufacturer or this manufacturer's certified installer only with a minimum of 5 years experience.

ITEM 12 NOT USED

ITEM 13 NOT USED

ITEM 14 NOT USED

ITEM 15 DRY STORAGE DUNNAGE RACKS: 6 REQUIRED

A. Owner furnished and installed.

ITEM 16 KITCHEN DRY STORAGE SHELVING: 1 LOT REQUIRED

A. Owner furnished and installed.

ITEM 17 PIZZA PREP-TOP REFRIGERATOR: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 18 SNACK TRANSPORT CARTS: 30 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 19 GLASS DOOR REFRIGERATOR: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 20 GLASS DOOR FREEZER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 21 REACH-IN DUAL TEMP REFRIGERATOR/FREEZER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 22 REACH-IN DUAL TEMP REFRIGERATOR/FREEZER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 23 REACH-IN FREEZER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 24 SLIM JIMS: 7 REQUIRED

- A. Owner furnished and installed.

ITEM 25 HAND WASHING SINKS: 7 REQUIRED

- A. Advance Tabco, model 7-PS-44 *H011. Include #7-PS-15 12" high stainless steel welded side splash shields.
- B. Seal to wall.

ITEM 26 CUBE ICE MACHINE WITH STORAGE BIN: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 27 SUPPORT TABLE WITH SINK: 1 REQUIRED

- A. Pacific Stainless Products, model PTS-6630C8L20S *H011 fully welded custom prep table with single sink. Sink table shall incorporate the following:
 1. CHG Saniguard, model KL54-8008 splash mount faucet at sink
 2. One Component Group, model DSS-8000 rotary waste assembly with 14-gauge stainless steel lever waste brackets welded to underside of sink compartments.
 3. Sound deaden underside of top and sink compartments.

4. Model TMSC6614 table mount cantilever shelf. Install with 18-inch clearance from table top. Seal post penetrations in backsplash.
5. One model SDAS-202006S stainless steel drawer assembly as shown.

B. Install assembly complete. Clip and seal to wall.

ITEM 28 NOT USED

ITEM 29 NOT USED

ITEM 30 STAFF COMPUTER WORK STATION: 1 LOT REQUIRED

A. Owner furnished and installed.

ITEM 31 VEGETABLE PREPARATION SINK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model TCS-2428-14-B30 *H011 fully welded custom "Spec Line" sink table in configuration per plan. Include the following accessories:
1. CHG Saniguard, model KL53-1000-AF8-BR spray rinse faucet with Add-on faucet. Include wall bracket. Install between sinks.
 2. One CHG Saniguard, model KL54-8010 splash mount faucet.
 3. Three CHG Saniguard, model DSS-8015 rotary waste assemblies with overflows.
 4. 14" deep sinks.
 5. Shelf under right drainboard.
 6. Sound deaden underside of top and sink compartments.

B. Submit factory drawing for approval.

C. Install assembly complete. Clip and seal to wall.

ITEM 32 VEGETABLE PREPARATION SINK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model TCS-2428-14-B30 *H011 fully welded custom "Spec Line" sink table in configuration per plan. Include the following accessories:
1. CHG Saniguard, model KL53-1000-AF8-BR spray rinse faucet with Add-on faucet. Include wall bracket. Install between sinks.
 2. One CHG Saniguard, model KL54-8010 splash mount faucet.
 3. Three CHG Saniguard, model DSS-8015 rotary waste assemblies with overflows.
 4. 14" deep sinks.
 5. Shelf under left drainboard.
 6. Sound deaden underside of top and sink compartments.

B. Submit factory drawing for approval.

C. Install assembly complete. Clip and seal to wall.

ITEM 33 FOOD PROCESSOR: 1 REQUIRED

A. Existing equipment. Relocate and reinstall in location shown.

ITEM 34 MOBILE ISLAND WORK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKT-7230-IS *H011 fully welded table with the following accessories:
 - 1. Two model SDAS-202006S stainless steel drawer assemblies as shown.
 - 2. Model CHGC23-1451 casters with brakes.
 - 3. Match length show on Sheet FS1.04.
- B. Install assembly complete.

ITEM 35 UTILITY CARTS: 6 REQUIRED

- A. Owner furnished and installed.

ITEM 36 MOBILE SLICER CARTS: 2 REQUIRED

- A. Owner furnished and installed.

ITEM 37 SLICERS: 2 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 38 SPEED RACKS: 8 REQUIRED

- A. Owner furnished and installed.

ITEM 39 MOBILE ISLAND WORK TABLES: 2 REQUIRED

- A. Pacific Stainless Products, model WKS9630-IS*H011 fully welded table with the following accessories:
 - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
 - 2. Model CHGC23-1451 casters with brakes.
 - 3. Provide full length stainless steel under shelf.
- B. Install assembly complete.

ITEM 40 MEAT CUTTER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 41 FOOD CUTTER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 42 MOBILE FOOD CUTTER CART: 1 REQUIRED

- A. Owner furnished and installed.

ITEM 43 NOT USED

ITEM 44 MAPLE TOP BAKER'S TABLE: 1 REQUIRED

A. Pacific Stainless, model WWKT-7230IS *H011. Include the following:

1. One model SDAS-202006S stainless steel drawer assembly as shown.
2. Model CHGC23-1451 casters with brakes.
3. Provide full length stainless steel under shelf.

B. Install assembly complete.

ITEM 45 PREP TOP REFRIGERATOR: 1 REQUIRED

A. Delfield, model 4472N-18 *H011 with the following accessories:

1. Flat lift-off cover.
2. Door locks.
3. Interior lights.
4. Exterior thermometer.

B. Install assembly complete.

ITEM 46 ISLAND WORK TABLE: 1 REQUIRED

A. Pacific Stainless Products, model WKT-7230-IS *H011 fully welded table with the following accessories:

1. Two model SDAS-202006S stainless steel drawer assemblies as shown.
2. Adjustable stainless steel flanged feet.
3. Match length show on Sheet FS1.04.

B. Install assembly complete.

ITEM 47 NOT USED

ITEM 48 NOT USED

ITEM 49 80-QUART MIXER: 1 REQUIRED

A. Hobart, model HL800 *H011. Provide with Standard Accessory Package.

ITEM 50 FILL FAUCET: 1 REQUIRED

A. Fisher, model 2250 *H011.

ITEM 51 SUPPORT TABLE WITH SINK: 1 REQUIRED

A. Pacific Stainless Products, model PTS-12030C8C24DS *H011 fully welded custom prep table with single sink. Sink table shall incorporate the following:

1. CHG Saniguard, model KL54-8008 splash mount faucet at sink

2. One Component Group, model DSS-8000 rotary waste assembly with 14-gauge stainless steel lever waste brackets welded to underside of sink compartments.
3. Sound deaden underside of top and sink compartments.
4. Model TMSC7814 table mount cantilever shelf aligned with left end of table. Install with 18-inch clearance from table top. Seal post penetrations in backsplash.
5. Stainless steel shelves below each drainboard.
6. One model SDAS-202006S stainless steel drawer assembly below right drainboard.

B. Install assembly complete. Clip and seal to wall.

ITEM 52 FOOD PROCESSOR: 1 REQUIRED

A. Existing equipment. Relocate and reinstall in location shown.

ITEM 53 MEAT PREP SINK TABLE: 1 REQUIRED

A. Pacific Stainless Products, model DCS-2424-14-B48(left)-B42(right) *H011 fully welded custom sink table. Sink table shall incorporate the following:

1. CHG Saniguard, model KL53-1000-AF8-BR spray rinse faucet with Add-on faucet. Include wall bracket. Install between sinks.
2. Two Component Group, model DSS-8000 rotary waste assemblies with 14-gauge stainless steel lever waste brackets welded to underside of sink compartments.
3. Sound deaden underside of top and sink compartments.
4. Provide under shelf and leg bracing as detailed.
5. Provide undershelves below right and left drainboards.

B. Install assembly complete. Clip and seal to wall.

ITEM 54 CANOPY HOOD WITH FIRE PROTECTION SYSTEM: 1 REQUIRED

A. Halton, model KVC *H011 Capture Jet 18-gauge stainless steel island canopy hood. Refer to Factory File #U17-165. The hood shall incorporate the following:

1. UL listed damper assembly.
2. Supply air plenums.
3. MARVEL System with control panel to control this hood and Items 54, 72, and 85.
4. LED light fixtures as shown on Halton factory drawings. Furnish and install lamps.
5. Auto-Start Control panel.
6. Ansul Piranha Fire Protection System with Automan Regulated Release Assembly furnished and installed by Halton. Refer to factory drawings. Install in accordance with NFPA bulletin 96, including all current amendments to protect this hood including surface protection as required. All piping and conduit shall be run concealed in walls or above ceiling, except where exposure is necessary for functional reasons. Exposed piping shall be chrome plated or run in stainless steel sleeves. Include reset relays and manual remote pull station. System shall connect to mechanical gas shut-off valve furnished loose by Halton. All contactors are furnished by the Electrical Division for shut down of electric supply to all equipment in the event of system activation.
7. Include 18-gauge stainless steel removable closure panels and trim as required to seal hood to ceiling and walls. Verify ceiling height. Submit shop drawings prior to fabrication.

8. Install hood with 80" clearance from finished floor.

B. Exhaust and supply duct work and fans furnished and installed by Division 23.

ITEM 55 STAINLESS STEEL WALL FLASHING: 1 LOT REQUIRED

A. Fabricate 20-gauge stainless steel Number 4 finish wall flashing bonded to gypsum board with heat resistant mastic beginning directly above base tile on wall and terminating 2" above bottom edge of canopy hood. Flashing shall run full length of canopy hood and ends at wall returns.

B. Note: ceiling and wall flashing shall meet Mechanical Code Sections 507.4 and 507.9. Verify all requirements and provide flashing (insulated for 1-hour rating if required) to meet the codes.

C. Install flashing with no exposed fasteners or screws in interlocking sections of equal lengths. Verify that surfaces are flat and smooth with a maximum variation of 1/16" in 10 feet.

D. Install assembly complete.

ITEM 56 GRIDDLES WITH STANDS: 2 REQUIRED

A. Vulcan, model HEG60E *H011 with the following accessories:

1. Stainless steel stand with marine edges and casters.

B. Install assembly complete.

ITEM 57 FLOOR TROUGHS: 3 REQUIRED

A. Pacific Stainless, model FT4224-FG *H011 with fiberglass grate.

B. Coordinate exact location to best serve the equipment pour path and verify rough-in size prior to slab pour.

ITEM 58 40-GALLON TILTING SKILLETS: 2 REQUIRED

A. Vulcan, model VE40 *H011 with the following accessories:

1. Double pantry double-jointed faucet with mounting bracket.

B. Install assembly complete.

ITEM 59 FRENCH PLATE/FRY TOP RANGE: 1 REQUIRED

A. Vulcan, model EV36S-2FP24G208 *H011.

B. Install assembly complete.

ITEM 60 DOUBLE STACK CONVECTION STEAMERS: 1 REQUIRED

A. Existing equipment. Relocate and reinstall in location shown.

ITEM 61 DOUBLE-STACK CONVECTION OVENS: 1 REQUIRED

- A. Vulcan, model VC44ED *H011.
- B. Install assembly complete.

ITEM 62 COOK'S SUPPORT TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS9630-IS *H011 fully welded table with the following accessories:
 - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
 - 2. Model CHGC23-1451 casters with brakes.
 - 3. Provide full length stainless steel under shelf.
- B. Install assembly complete.

ITEM 63 BLENDER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 64 REACH-IN REFRIGERATOR: 1 REQUIRED

- A. Owner furnished and installed.

ITEM 65 MOBILE WORK TABLES: 2 REQUIRED

- A. Pacific Stainless Products, model WKS7230IS *H011 fully welded table with the following accessories:
 - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
 - 2. Model CHGC23-1451 casters with brakes.
 - 3. Model TMSS7212P table mount over shelf.
- B. Install assembly complete.

ITEM 66 MOBILE ISLAND WORK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS9648IS *H011 special width fully welded table with the following accessories:
 - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
 - 2. Model CHGC23-1451 casters with brakes.
 - 3. Provide full length stainless steel under shelf.
- B. Install assembly complete.

ITEM 67 FLOOR TROUGHS: 2 REQUIRED

- A. Pacific Stainless, model FT10224-FG *H011 with standard fiberglass grating.

- B. Coordinate exact location to best serve the equipment pour path and verify rough-in size prior to slab pour.

ITEM 68 MOBILE ISLAND WORK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS9630IS *H011 fully welded table with the following accessories:
 - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
 - 2. Model CHGC23-1451 casters with brakes.
 - 3. Provide full length stainless steel under shelf.
- B. Install assembly complete.

ITEM 69 VEGETABLE CUTTER/SLICER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 70 ROLL-IN RACK OVEN WITH FIRE PROTECTION SYSTEM: 1 REQUIRED

- A. Baxter, model OV500E2 *H011 with the following accessories:
 - 1. Grease filters for Type I application.
 - 2. Ansul R-102-AREF Chemical Fire Protection System with Automan Regulated Release Assembly. Install in accordance with NFPA bulletin 96, including all current amendments to protect this oven as required. All piping and conduit shall be run concealed in walls or above ceiling, except where exposure is necessary for functional reasons. Exposed piping shall be chrome plated or run in stainless steel sleeves. Include reset relays and manual remote pull station. System shall connect to mechanical gas shut-off valve furnished loose by Gaylord. All contractors are furnished by the Electrical Division for shut down of electric supply to all equipment in the event of system activation. System control cabinet shall be installed in location shown.
 - 3. Provide 18-gauge stainless steel all-welded grease tight round duct to 4" above finished ceiling. Verify diameter.
- B. Field verify size access/conditions before ordering.
- C. Install assembly complete.
- D. Concealed exhaust duct work and fan furnished and installed by Mechanical Division.

ITEM 71 MOBILE OVEN RACKS: 8 REQUIRED

- A. Baxter, model BSRSB-20A *H011.

ITEM 72 CANOPY HOOD WITH FIRE PROTECTION SYSTEM: 1 REQUIRED

- A. Halton, model KVC *H011 Capture Jet 18-gauge stainless steel island canopy hood. Refer to Factory File #U17-165. The hood shall incorporate the following:
 - 1. UL listed damper assembly.
 - 2. Supply air plenums.

3. Refer to Item 54 for MARVEL system.
4. LED light fixtures as shown on Halton factory drawings. Furnish and install lamps.
5. Auto-Start Control panel.
6. Ansul Piranha Fire Protection System with Automan Regulated Release Assembly furnished and installed by Halton. Refer to factory drawings. Install in accordance with NFPA bulletin 96, including all current amendments to protect this hood including surface protection as required. All piping and conduit shall be run concealed in walls or above ceiling, except where exposure is necessary for functional reasons. Exposed piping shall be chrome plated or run in stainless steel sleeves. Include reset relays and manual remote pull station. System shall connect to mechanical gas shut-off valve furnished loose by Halton. All contactors are furnished by the Electrical Division for shut down of electric supply to all equipment in the event of system activation.
7. Include 18-gauge stainless steel removable closure panels and trim as required to seal hood to ceiling and walls. Verify ceiling height. Submit shop drawings prior to fabrication.
8. Install hood with 80" clearance from finished floor.

B. Exhaust and supply duct work and fans furnished and installed by Division 23.

ITEM 73 STAINLESS STEEL WALL FLASHING: 1 LOT REQUIRED

- A. Fabricate 20-gauge stainless steel Number 4 finish wall flashing bonded to gypsum board with heat resistant mastic beginning directly above base tile on wall and terminating 2" above bottom edge of canopy hood. Flashing shall run full length of canopy hood and ends at wall returns.
- B. Note: ceiling and wall flashing shall meet Mechanical Code Sections 507.4 and 507.9. Verify all requirements and provide flashing (insulated for 1-hour rating if required) to meet the codes.
- C. Install flashing with no exposed fasteners or screws in interlocking sections of equal lengths. Verify that surfaces are flat and smooth with a maximum variation of 1/16" in 10 feet.
- D. Install assembly complete.

ITEM 74 DOUBLE-STACK CONVECTION OVENS: 3 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 75 ROLL-IN COMBI-OVEN STEAMERS: 2 REQUIRED

- A. Alto-Shaam, model CTP20-20E *H011 Proformance Combitherm with the following accessories:
 1. Window door.
 2. Door lock with key.
 3. Full perimeter bumper.
 4. Factory recommended water filtration system.
- B. Install assembly complete.

ITEM 76 TWO 6-GALLON TILTING KETTLES WITH STAND: 1 REQUIRED *[Addendum 3]*

- A. Cleveland, model 36-EM-K66-24 *H011 with the following accessories:

- ~~1. 2-inch tangent draw-off valve with strainer.~~
2. Kettle accessory kit.
3. Console mount 3/4" double pantry fill faucet with swing spout and sprayer hose.
- ~~4. Spring-assist hinged stainless steel cover.~~
5. Food and drain strainers.
- ~~6. Measuring strip.~~

B. Install assembly complete.

ITEM 77 100-GALLON STATIONARY KETTLES: 2 REQUIRED *[Addendum 3]*

A. Cleveland, model KEL-100-SH *H011 with the following accessories:

1. 2-inch tangent draw-off valve with strainer.
2. Kettle accessory kit.
3. Console mount 3/4" double pantry fill faucet with swing spout and sprayer hose.
4. Lift-off stainless steel cover.
5. Food and drain strainers.
6. Measuring strip.

B. Install assembly complete.

ITEM 78 100-GALLON COOKER/MIXER KETTLE: 1 REQUIRED

A. Cleveland, model MKEL-100-T *H011 with the following accessories:

1. 2-inch tangent draw-off valve with strainer.
2. Kettle accessory kit.
3. Console mount 3/4" double pantry fill faucet with swing spout and sprayer hose.
4. Lift-off stainless steel cover.
5. Food and drain strainers.
6. Measuring strip.
7. Model MFS Pump metering filling station.

B. Install assembly complete.

ITEM 79 BLAST CHILLER RACKS: 40 REQUIRED

A. Owner furnished and installed.

ITEM 80 ROLL-IN BLAST CHILLERS: 4 REQUIRED *[Addendum 3]*

A. (1) is future equipment.

B. **American Panel** HurriChill, model ~~AP24BC250-3 AP80BC700-3~~ *H011. **Include the following:**

1. **USB HACCP Interface.**
2. **(4) Non-Heated probes (turn over to Owner for back-up).**

C. Install assembly complete.

ITEM 81 BEVERAGE TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS7236-A6S *H011 fully welded custom prep table. Table shall incorporate the following:
 - 1. Sound deaden underside of top and sink compartments.
 - 2. Model TMSC3614 table mount cantilever shelf; align with right end of table. Install with 18-inch clearance from table top. Seal post penetrations in backsplash.
 - 3. One model SDAS-202006S stainless steel drawer assembly as shown.
 - 4. Left end splash.
- B. Install assembly complete. Clip and seal to walls.

ITEM 82 SODA DISPENSER: 1 REQUIRED

- A. Vendor furnished and installed, freestyle.

ITEM 83 MEAL TRANSPORT CARTS: 64 REQUIRED

- A. Owner furnished and installed.

ITEM 84A TRAY LINE MOBILE STARTER TABLES: 4 REQUIRED

- A. Eagle Group, model T30488E-HA-L/R *H011.

ITEM 84B TRAY LINE COLD DISH-UP WELLS: 4 REQUIRED

- A. Turbo Air, model JBT-72 *H011 with the following accessories:
 - 1. Model M726500200 5" casters with brakes.
 - 2. Model SNZ-72 sneeze guard.
 - 3. Model TS-72 tray slide.
- B. Install assembly complete.

ITEM 84C TRAY LINE TRAY LOWERATOR CARTS: 4 REQUIRED

- A. Lakeside, model 217 *H011.

ITEM 84D TRAY LINE SLIDER TABLES: 16 REQUIRED

- A. Burlodge, model B2-ST-M-2330 *H011.

ITEM 84E TRAY LINE MOBILE GRAB 'N GO SHELVING: 12 REQUIRED

- A. InterMetro, model QB4874-1A *H011 qwikSIGHT single sided shelf system with casters. Include the following:
 - 1. Include four (4) 12" x 18" QB1218B baskets per tier.
 - 2. Start baskets 36" above finished floor.

3. ***Four (4) model QB48 4" diameter casters with brakes. [Addendum 3]***

B. Install assembly complete.

ITEM 85 CANOPY HOOD WITH FIRE PROTECTION SYSTEM: 1 REQUIRED

F. Halton, model KVC *H011 Capture Jet 18-gauge stainless steel island canopy hood. Refer to Factory File #U17-165. The hood shall incorporate the following:

1. UL listed damper assembly.
2. Supply air plenums.
3. Refer to Item 54 for MARVEL system.
4. LED light fixtures as shown on Halton factory drawings. Furnish and install lamps.
5. Auto-Start Control panel.
6. Ansul Piranha Fire Protection System with Automan Regulated Release Assembly furnished and installed by Halton. Refer to factory drawings. Install in accordance with NFPA bulletin 96, including all current amendments to protect this hood including surface protection as required. All piping and conduit shall be run concealed in walls or above ceiling, except where exposure is necessary for functional reasons. Exposed piping shall be chrome plated or run in stainless steel sleeves. Include reset relays and manual remote pull station. System shall connect to mechanical gas shut-off valve furnished loose by Halton. All contactors are furnished by the Electrical Division for shut down of electric supply to all equipment in the event of system activation.
7. Include 18-gauge stainless steel removable closure panels and trim as required to seal hood to ceiling and walls. Verify ceiling height. Submit shop drawings prior to fabrication.
8. Install hood with 80" clearance from finished floor.

G. Exhaust and supply duct work and fans furnished and installed by Division 23.

ITEM 86 TRAY CART DOCKING STATIONS: 18 REQUIRED

A. Owner furnished and installed.

ITEM 87 SECURE CHEMICAL STORAGE SHELVING: 1 LOT REQUIRED

A. Owner furnished and installed.

ITEM 88 DISPOSER: 1 REQUIRED

A. Existing equipment. Relocate and reinstall in location shown.

ITEM 89 POTWASHING SOILED DISHTABLE: 1 REQUIRED

A. Existing equipment. Relocate and reinstall in location shown.

ITEM 90 VAPOR EXHAUST DUCTS: 2 REQUIRED

A. Existing equipment. Relocate and reinstall in location shown.

ITEM 91 POT/PAN WASHER AND BOOSTER HEATER: 1 REQUIRED

- A. Hobart, model CLPS86eN-EGR *H011 with 30KW booster heater for left to right/right to left operation. Include the following:
 - 1. Model CLPS86eN-EGRHTE15K 15KW electric tank heater.
 - 2. Model BDELRAAX-HTSDOM blower-dryer.
 - 3. Single point electrical connection.
 - 4. 6-inch higher than standard chamber.
 - 5. Table limit switch.
- B. Install assembly complete.

ITEM 92 BLOWER/DRYER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 93 CLEAN DISHTABLE: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 94 NOT USED

ITEM 95 EYE WASH STATION: 1 REQUIRED

- A. Specified by Plumbing Division.

ITEM 96 HIGH PRESSURE WASH SYSTEM: 1 REQUIRED

- A. Spray Master Technologies, model 600REY *H011 rack mounted central system with four (4) remote ports.

ITEM 97 MOBILE WASTE RECEPTACLES: 10 REQUIRED

- A. Owner furnished and installed.

ITEM 98 TROUGH WASTE COLLECTOR: 1 REQUIRED

- A. Salvajor, model S419 *H011 trough collector with the following accessories:
 - 1. Additional scrap basket.
 - 2. Trough inlet and two rubber gusher heads equally spaced along trough length.
- B. Install assembly complete in Item 102 Soiled Dishtable.

ITEM 99 MOBILE DISH CARTS: 2 REQUIRED

- A. Owner furnished and installed.

ITEM 100 FLOOR TROUGHS: 3 REQUIRED

- A. Pacific Stainless, model FT12012-FG *H011 with fiberglass grate.

- B. Coordinate exact location to best serve the equipment pour path and verify rough-in size prior to slab pour.

ITEM 101 VAPOR EXHAUST DUCTS: 2 REQUIRED

- A. Fabricate two 18-gauge stainless steel steam tight exhaust ducts as detailed and connect to stainless steel vent stacks furnished with Warewasher, Item 102. Extend each duct 4 inches above finished ceiling and trim with stainless steel at ceiling penetrations. Seal all gaps at trim.
- B. Exhaust fan furnished and installed under Division 23.

ITEM 102 OVAL WAREWASHER WITH DISHTABLES: 1 REQUIRED

- A. Stero, model ER-94S *H011 three tank conveyORIZED dishwasher with 27KW booster heater for right to left operation. Dishwasher includes power scrapper, power wash, power rinse, and high temperature final rinse. Include the following:
 - 1. Electric tank booster heater.
 - 2. Cold water aquastat.
 - 3. Vent cowl.
 - 4. Circuit breakers.
 - 5. Shutdown timer, rinse activated.
 - 6. 3-inch higher than standard chamber.
 - 7. Table limit switch.
 - 8. Factory inter-plumbing of booster heater.
- B. Provide one (1) TragenFlex Soiled Breakdown System *H011 as shown on TragenFlex drawings P178287-01 and P178287-03. System consists of:
 - 1. One (1) TragenFlex, model SDT *H011 Soiled Dish Table. Include the following:
 - a. Provide NSF Listed Soiled Dish Table, 14-gauge stainless steel top and trough as shown on plan. Table shall be formed with vertical and horizontal corners coved to a 3/4" radius. Provide one (1) magnetic silver, two (2) perforated stainless steel ledges, and (2) pre-rinse sprays with mixing valves.
 - b. Trough shall be 10" wide sloping from 3" to maximum with matching at the scrap accumulator mounted in the end of the trough. Furnish trough with connection for trough gusher for water line. TragenFlex to provide water line mounted under waste trough from end of trough to scrap accumulator.
 - c. Provide 9'-3" long overhead rack and storage shelf.
 - d. Support table on 1-5/8" diameter stainless steel legs with adjustable stainless steel flanged feet to be anchored with 3/8" bolts. Legs shall be positioned to align up front-to-back for maximum access for cleaning. Legs shall be supported with 12-gauge stainless steel leg channels. All cross rails shall be fully welded to legs with all welds polished and ground smooth.
 - e. Connection: 1/2" diameter hot and cold water (2 places); where shown on plan.
 - 2. One (1) TragenFlex, model KBC-200 *H011 Knuckle Belt Rack Transfer Conveyor.
 - a. Provide Knuckle Belt Rack Transfer Conveyor as shown on plan. Unit shall be TragenFlex Model KBC-200, speed to match speed of dish machine, using an AC

- Inverter for varying the speed. Conveyor to form an integral part of scrapping table and purpose of conveyor to carry standard 20" x 20" racks directly into rack-style dish machine.
- b. Knuckle belt shall be equal to a pivot-radius, or multi-flex chain as used in commercial food plant operations.
 - c. Connection: 1/2" diameter hot and cold water (1 place); where shown on plan.
 - d. Connection: 1-1/2" drain (1 place); where shown on plan.
 - e. Control System
 - 1) Provide UL Listed Main Control Center for Knuckle Belt Rack Transfer Conveyor containing main disconnect, start-stop, speed control, and indicating lights. All components shall be neatly contained in a stainless steel watertight enclosure. All wiring shall conform to the latest UL standards. The electrical contractor shall bring 208V/1phase/15A to the main of the panel, but wiring from the equipment to this panel shall be done by TragenFlex and all wiring shall be carried in liquid tight conduits, including conveyor motor and controls. All electrical controls shall be approved for wet conditions and shall comply with all applicable codes. All enclosures for electrical components must be watertight.
 - f. Slide Bed
 - 1) Provide 14-gauge stainless steel bed formed with vertical and horizontal corners coved to a 1/4" radius. Unit shall be reinforced with channel mounted on 1-5/8" diameter tubular stainless steel legs with adjustable bullet feet and rails. Edges of table to be 2" standard boxed around Knuckle Belt Conveyor.
 - g. Installation & Warranty
 - 1) TragenFlex shall be responsible for all interconnections of Electrical work required for conveyor system. Final connections to building services shall be by others. TragenFlex shall install and adjust system to owner's satisfaction and shall provide adequate instructions to operating personnel. System shall be guaranteed for a period of one year for parts and labor under normal operating Plumbing interconnections shall be by K.E.C.
3. One (1) TragenFlex, model GRC *H011 Clean Dish Roller Table.
- a. Provide NSF listed Clean Dish Table, 14-gauge stainless steel formed with vertical and horizontal corners coved to a 3/4" radius.
 - b. Table to be equipped with turned up sides with hem edge 2" above top of roller on both sides. Table to be connected to exit end of dishmachine to provide a drip-proof connection. Slope table to drain, built into table where shown on plan. Table shall be designed to accept a gravity roller conveyor to carry dish racks from dish machine smoothly & designed to help the drip drying of racks.
 - c. Gravity roller conveyor shall be in accordance with the following:
 - 1) Rollers shall be 1.9" diameter blue PVC, fitted with polypropylene bearings with stainless steel balls. Rollers shall be spaced at approximately 5-1/2" centers. Shafts shall be 7/16" hexagon aluminum securely bolted to side

rails. Side rails shall be 1/8" x 2" stainless steel resting on support pins welded to side of conveyor bed to keep rollers elevated above bottom of bed for effective draining of water from dish racks. At exit of dishmachine, first three (3) rollers shall be stainless steel tubing construction. Table to be supported on 1-5/8" diameter stainless steel legs with adjustable stainless steel flanged feet to be anchored with 3/8" bolts. Legs shall be supported on 12-gauge stainless steel leg channels. All cross rails to be fully welded to legs with all welds polished and ground smooth. Provide a pre-wired accumulation switch at end of clean table integrated with dish machine to shut machine off when a rack reaches the end of the table.

- d. Connection: 1-1/2" drain (1 place); where shown on plan.
4. One (1) Advance Tabco, model DI-1-25 Hand Sink *H011.
 - a. Provide one (1) hand sink as shown on drawing. Sink to form an integral part of scraping table.
 - b. Connection: 1/2" diameter hot and cold water (1 place); where shown on plan.
 - c. Connection: 1-1/2" drain (1 place); where shown on plan.
 5. One (1) TragenFlex, model HRA-30 *H011 Retractable Hose Reel.
 - a. Provide one (1) retractable hose reels as shown on drawing. Assembly shall include 30'-0" heavy duty dairy-quality hose and heavy duty front trigger style water gun and hot and cold mixing valves.
 - b. Provide 14-gauge stainless steel bracket mounted under soiled dish table.
 - c. Connection: 1/2" diameter hot and cold water (1 Place); where shown on plan.
 6. One (1) TragenFlex, model SS2323 *H011 Mobile Soak Sink.
 - a. Provide one (1) Mobile Soak Sink where shown on plan. Unit shall measure 23" x 23" x 24" high x 8" deep sink and shall be mounted on 1-5/8" diameter stainless steel legs and 5" heavy-duty casters. Sink shall be formed of 14-gauge stainless steel with all corners coved to 5/8" radius. Provide rolled rims on all top edges and lever-operated 1-1/2" waste with open drain.

C. Install assembly complete.

ITEM 103 MOBILE TRAY DRYING RACKS: 3 REQUIRED

A. Owner furnished and installed.

ITEM 104 DEHYDRATOR: 1 REQUIRED

A. Future equipment.

B. Champion, model PHX-250 *H011 Phoenix dehydrator.

ITEM 105 NOT USED

ITEM 106 HOSE REEL: 1 REQUIRED

- A. Fisher, model 29602 *H011 with 50-foot hose.

ITEM 107 AIR CURTAINS: 2 REQUIRED

- A. Berner, model SLC07-1060A-A-SS *H011 with plunger switch to ensure unit is automatically activated when door is opened.

ITEM 108 NOT USED

ITEM 109 NOT USED

PART 3 - EXECUTION

3.1 SUPERVISION:

- A. A competent supervisor, representing the Kitchen Equipment Contractor (KEC), shall be present at all times during progress of the Kitchen Equipment Contractor (KEC)'s work.

3.2 SITE EXAMINATION:

- A. Verify site conditions under the provisions of the General Conditions, Supplementary Conditions and applicable provisions of Division 1 Sections. Notify the Architect, in writing, of unsatisfactory conditions for proper installation of food service equipment.
- B. Verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.
- C. Verify that wall reinforcement or backing has been provided, and is correct for wall supported equipment. Coordinate placement dimensions with wall construction Section.
- D. Verify that ventilation ducts are of the correct characteristics, and in the required locations.
- E. Verify that utilities are available, of the correct characteristics, and in the required locations.

3.3 INSTALLATION:

- A. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- B. Install items in accordance with manufacturer's instructions.

- C. Set each item of non-mobile and non-portable equipment securely in place, leveled and adjusted to correct height. Anchor to supporting substrate where indicated, and where required for sustained operation and use without shifting or dislocation. Conceal anchorages wherever possible. Adjust counter tops and other work surfaces to a level tolerance of 1/16 inch (maximum offset, and plus or minus on dimension, and maximum variation in 2'-0" run from level or indicated slope). Provide anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements. The Guidelines For Seismic Restraint of Kitchen Equipment, as prepared for the Sheet Metal Industry Fund of Los Angeles and endorsed by SMACNA, should be followed.
- D. Complete field assembly joints in the work (joints which cannot be completed in the shop) by welding, bolting-and-gasketing, or similar methods as indicated and specified. Grind welds smooth and restore finish. Set or trim flush, except for "T" gaskets as indicated.
- E. Provide closure plates and strips where required, with joints coordinated with units of equipment.
- F. Provide sealants and gaskets all around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes.
- G. Joints up to 3/8-inch-wide will be stuffed with backer rod to shape sealant bead properly, at 1/4 inch depth.
- H. At internal corner joints, apply sealant or gaskets to form a sanitary cove of not less than 3/8-inch radius.
- I. Shape exposed surfaces of sealant slightly concave with edges flush with faces of materials at joint.
- J. Provide sealant filled or gasketed joints up to 3/8-inch joint width. Wider than 3/8 inch, provide matching metal closure strips, with sealant application each side of strips. Anchor gaskets mechanically or with adhesives to prevent displacement.
- K. Treat enclosed spaces, inaccessible after equipment installation, by covering horizontal surfaces with powdered borax at a rate of 4 ounces per square foot.
- L. Insulate to prevent electrolysis between dissimilar metals.
- M. Cut and drill components for service outlets, fixtures, piping, conduit, and fittings.
- N. Coordinate the installation of approved dry pendant sprinkler head in each cooler and freezer. Sprinkler heads should be installed in coolers/freezers only if required by local codes.
- O. Verify and coordinate the mounting heights of all wall shelves and equipment, with equipment located below them for proper clearances.
- P. Coordinate with the Plumbing and Electrical Divisions and provide holes in food service equipment for plumbing and electrical service to and through the fixtures, as required. This includes welded sleeves, collars, ferrules, or escutcheons. Locate these services so that they do not interfere with intended use and/or servicing of the fixture. No alterations of the building are allowed without written permission by the General Contractor and/or Architect. (i.e. – routing refrigerant lines).

3.4 ADJUSTING:

- A. Test and adjust equipment, controls and safety devices to ensure proper working order and conditions.
- B. Repair or replace equipment which is found to be defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

3.5 CLEANING AND RESTORING FINISHES:

- A. After completion of installation and completion of other major work in food service areas, remove protective coverings and clean food service equipment internally and externally.
- B. Restore exposed and semi-exposed finishes, to remove abrasions and other damages, polish exposed metal surfaces and touch-up painted surfaces. Replace work, which cannot be successfully restored.
- C. Polish glass, plastic, hardware and accessories, fixtures and fittings.
- D. Wash and clean equipment and leave in a condition ready for the Owner to sanitize and use.

3.6 TESTING, START-UP AND INSTRUCTIONS:

- A. Delay the start-up of equipment until service lines have been tested, balanced, and adjusted for pressure, voltage and similar considerations and until water and steam lines have been cleaned and treated for sanitation.
- B. Plan for demonstration of food service equipment operation and maintenance in advance with the Owner/Operator. Training shall include a total of 16 hours in four (4) 4-hour sessions. Owner shall video tape training sessions.
- C. Demonstrate food service equipment to familiarize the Owner and the Operator on operation and maintenance procedures, including periodic preventative maintenance measures required. Include an explanation of service requirements and simple on-site service procedures as well as information concerning the name, address and telephone number of qualified local source of service. The individual performing the demonstration shall be knowledgeable of operating and service aspects of the equipment. Provide Owner with factory equipment training videos for all equipment that requires training for proper operation.
- D. Provide a written report of the demonstration to the Owner, outlining the equipment demonstrated and malfunctions or deficiencies noted. Indicate individuals present at demonstration.
- E. Final Cleaning: After testing and start-up, clean the food service equipment and leave in a condition ready for the Owner to sanitize and use.

3.7 CLEAR AWAY:

- A. Throughout the progress of their work, the Kitchen Equipment Contractor (KEC) shall keep the working area free from debris and shall remove rubbish from premises resulting from work being done by them. At the completion of their work, the Kitchen Equipment Contractor (KEC) shall leave the premises in a clean and finished condition.

3.8 COMMISSIONING OF EQUIPMENT

- A. Applies to 1) Walk-in Coolers and Freezers and 2) Kitchen Hood Systems: Selected Division 11 equipment and systems referenced are to be commissioned per Section 01 91 13 – General Commissioning Requirements and Section 11 08 00, Commissioning of Conveying Equipment. The contractor has specific responsibilities for schedule, coordination, startup, test development, testing, and documentation. Coordinate all commissioning activities with the Commissioning Authority.

END OF SECTION 114000

SECTION 117100 – MEDICAL PROCESSING EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes coordination with third-party vendor for delivery and installation of Owner Furnished and Vendor Installed (OFVI) medical processing equipment.
- B. Related Sections:
 - 1. Divisions 22-23 Sections for plumbing and mechanical utility rough-in work.
 - 2. Division 26 Sections for electrical utility rough-in work.

1.3 SUBMITTALS

- A. Rough-In Drawings:
 - 1. Submit electronic PDF file for approval.
 - 2. These drawings shall be dimensioned from grid lines showing location of ducts, stubs, floor and wall sleeves for ventilation, plumbing, electrical, and related dimensions as required for equipment so supported.
 - 3. Site-verify mechanical, electrical and ventilating rough-in and sleeve locations.

1.4 PRE-INSTALLATION CONFERENCE

- A. Arrange, in accordance with Division 01 Section “Project Meetings.”
- B. Attendance: Contractor, Vendor/Installer, Owner, Architect, and as requested to attend.
- C. Arrange conference and job walk-through, minimum 2 weeks prior to completion of under slab-on-grade utility work of this Section.

1.5 PRODUCT HANDLING AND PROTECTION

- A. Delivery and Storage: The Contractor shall be responsible for receiving and warehousing of equipment until ready for installation.
 - 1. Coordinate requirements with equipment manufacturer.
 - 2. Receive equipment at a loading dock with capacity for non-power tailgate delivery.
 - 3. Receive and inspect new equipment with the Owner’s representative for damage and store in weather-protected, secure area inside Building 22.
- B. Handling Materials and Equipment: Verify and coordinate conditions at the building site, particularly door and/or wall openings and passages to assure access for all equipment.

- C. Protect the equipment against theft and damage during the progress of the project until final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 MEDICAL PROCESSING EQUIPMENT (Owner Furnished, Vendor Installed)

- A. Equipment Type CS01 – STERIS Corporation / Model CCPS3110835AH
106” Triple Bay Stainless Steel Clean-up Sink, adjustable height.
- B. Equipment Type CS02 – STERIS Corporation / Model CCPS317235
72” Single Bay Stainless Steel Clean-up Sink, fixed height.
- C. Equipment Type CS03 – STERIS Corporation / Model CR115
Caviwave Ultrasonic Cleaner, 15 Gallon.
- D. Equipment Type CS04 – STERIS Corporation / Model CRT5A
Reliance Table Top Ultrasonic Cleaner, 5.75 Gallon.
- E. Equipment Type CS05 – STERIS Corporation / Model FH14043
Amsco Washer Disinfector 5052.
- F. Equipment Type CS06 – STERIS Corporation / Model CG71005
Pass-Thru Window with set down counter.
- G. Equipment Type CS07 – STERIS Corporation / Model CG51
Work Table Base, positionable.
- H. Equipment Type CS08 – STERIS Corporation / Model SR2222213011
Amsco 400 Medium Steam Sterilizer, recessed.
- I. Equipment Type CS10 – STERIS Corporation / Model CH10861
100 KW Electric Steam Sterilizer.
- J. Equipment Type CS11 – STERIS Corporation / Model AW00HCS2052
AmeriWater RO2 System with high flow pump and 100 gallon tank.
- K. Equipment Type CS12 – Thermo Fisher / Barnstad E-Pure Model D4631
Ultra-Pure Water Filtration System.
- L. Equipment Type CS13 – STERIS Corporation / Model
Chemistry Dispenser, wall mounted.
- M. Equipment Type PH01 – BD Pyxis / Model C^{II} Safe Main
C^{II} System Double Column Integrated Main Unit.
- N. Equipment Type PH02 – BD Pyxis / Model C^{II} Safe Auxiliary
C^{II} System Double Column Auxiliary Unit.
- O. Equipment Type PH03 – BD Pyxis / Model C^{II} Printer
C^{II} System Printer.
- P. Equipment Type PH06 – BD Pyxis / PAR_x System Workstation
Medication Inventory System Workstation and Monitor.
- Q. Equipment Type PH09 – BD Pyxis / MedStation 4000
2-Drawer MedStation Cabinet.
- R. Equipment Type PH10 – Nuair Inc / NU-201-436
Horizontal Laminar Airflow Workstation.
- S. Equipment Type PH11 – Nuair Inc / NU-540-400 (future equipment)
Class II, Type A2 Biological Safety Cabinet.
- T. Equipment Type PH15 – BD Pyxis / System Server
Medication Inventory System Server.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare site to enable equipment installation according to the construction documents and the Vendor equipment drawings/technical documentation to include walls, floors, drains, ceilings, building utility connections, including steam drip-legs and pressure regulators.
- B. Assure that all door openings, hallways and areas in route from receiving area to installation site are clear and will accept equipment without dismantling equipment or removing/modifying any door frames, ceilings, cabinets or other facility structures. Provide floor protection.
- C. Furnish and install electrical disconnects and final termination to Vendor equipment, coordinate locations with Vendor.
- D. Furnish and install shutoff valves below finished ceiling and within reach for service shutdown, coordinate locations with Vendor.
- E. Provide adequate lighting in equipment service areas for installation.
- F. Provide adequate service area around equipment, disconnects, and shutoff valves as specified in Vendor equipment drawings and in accordance with local/state/federal codes.
- G. Vendor will require a minimum two (2) weeks' notice prior to beginning actual installation work, with clear access to final equipment locations.

3.2 CLEANING

- A. The Vendor will be responsible for cleanup of all packing materials, crates, crating and/or other debris of transporting/setting up the equipment, but containers/dumpsters must be provided by the Contractor.

END OF SECTION 117100

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Motor-operated roller shades with single rollers.

- B. Related Requirements:

- 1. Division 06 Section "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section. This includes but is not limited to all required extrusions, accessories, controls and fabricated roller shades.

- B. Installer Qualifications: Engage an installer, which shall assume responsibility for installation of all system components, with the following qualifications.

- 1. Installer for roller shade system shall be trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

- C. Requirements for Electronic Hardware, Controls, and Switches:

- 1. Roller shade hardware, shade fabric, EDU, and all related controls shall be furnished and installed as a complete two-way communicating system and assembly.

1.4 SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
 - 1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.
 - C. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.
 - D. Product Schedule: For roller shades.
- 1.5 \CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.
- 1.7 FIELD CONDITIONS
- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- 1.8 WARRANTY
- A. Warranty: Provide manufacturer's standard warranties, including the following:
 - 1. Roller Shade Hardware, and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.
 - 2. Electronic Roller Shade EDU's and EDU Control Systems: Manufacturer's standard non-depreciating five-year warranty.
 - 3. Roller Shade Installation: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.
- B. Basis of Design: Motorized Electro 3 as manufactured by MechoSystems, 718-729-2020, www.mechosystems.com. Subject to compliance with requirements, provide the named product or another product that has been approved prior to bid.

2.2 MOTOR-OPERATED, SINGLE-ROLLER SHADES

- A. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
 - 1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Electric Drive Unit (EDU): Manufacturer's standard tubular, enclosed in roller with built-in reversible capacitor.
 - a. Electrical Characteristics: 120VAC/60Hz, (230VAC/50Hz) single phase, temperature Class B, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each EDU..
 - b. Maximum Total Shade Width: As required to operate roller shades indicated.
 - c. Maximum Shade Drop: As required to operate roller shades indicated.
 - d. Maximum Weight Capacity: As required to operate roller shades indicated.
 - 3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
 - a. Individual/Group Control Station: Maintained-contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for individual and group control.
 - 4. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
 - 5. Operating Features:
 - a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.

- b. Capable of accepting input from building automation control system.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Shadebands:
- 1. Shade Bands: Construction of shade band includes the fabric, the enclosed hem weight, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
 - a. Concealed Hembar: Shall be continuous extruded aluminum for entire width of shade band and with the following characteristics:
 - 1) Hembar shall be heat sealed on all sides.
 - 2) Open ends shall not be accepted.
 - b. Shade Band and Shade Roller Attachment:
 - 1) Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
 - 2) Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a “snap-on” snap-off” spline mounting, without having to remove shade roller from shade brackets.
 - 3) Mounting Spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
 - 4) Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets, does not meet the performance requirements of this specification and shall not be accepted.
 - 2. Shadeband Material:
 - a. Basis of Design Product: MechoSystems, ThermoVeil® group, single thickness, opaque non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl, in colors selected from manufacturer’s available range.

- 1) Dense Basket Weave: "1300 series", 5 percent open, 2 by 2 dense basket-weave pattern.
 - 2) Color as selected by Architect.
- E. Installation Accessories:
1. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
 - a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open.
 - b. Provide "Vented Pocket" such that there will be a minimum of four 1 inch diameter holes per foot allowing the solar gain to flow above the ceiling line..
 2. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, locations of connections to building electrical system, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C. Roller Shade Locations: At all south and east facing exterior windows, storefront, or curtainwall, excluding vestibules and lounges.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 122413

SECTION 123570 - HEALTHCARE CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Stainless steel healthcare casework.
- 2. Cabinet hardware.
- 3. Glazing

- B. Related Requirements:

- 1. Division 9 Section "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring healthcare casework.

1.3 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of healthcare casework.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For healthcare casework.

- 1. Include plans, elevations, sections, and attachments to other work, including locations of blocking and reinforcements required for installation.
- 2. Show fabrication details, including types and locations of hardware.
- 3. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.
- 4. Include coordinated dimensions for equipment specified in other Sections.
- 5. Indicate manufacturer's catalog numbers for casework.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.6 FIELD CONDITIONS

- A. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming

at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

- B. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain from single source from single manufacturer.
- B. Product Designations: Drawings indicate sizes and configurations of healthcare casework by referencing designated manufacturer's catalog numbers. Other manufacturers' metal healthcare casework of similar sizes, of similar door and drawer configurations, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."
- C. Quality Standard Manufacturer and Product: Series 7 stainless steel cabinets as manufactured by Carr Corporation, 800-952-2398, www.carrcorporation.com
 - 1. Type SS1 Base Cabinets: Carr 7302-30S 2-door stainless steel cabinet with glass doors and stainless steel marine edge countertop. Nominal dimensions 30 inches wide x 24 inches deep x 36 inches tall.
 - 2. Type SS2 Base Cabinets: Carr 7302-36S 2-door stainless steel cabinet with glass doors and stainless steel marine edge countertop. Nominal dimensions 36 inches wide x 24 inches deep x 36 inches tall.
 - 3. Type SS3 Base Cabinets: Carr 7321-24S 6-drawer stainless steel cabinet with stainless steel marine edge countertop. Nominal dimensions 24 inches wide x 24 inches deep x 36 inches high.
 - 4. Type SS4 Sink Cabinet: Carr 7334-30S 2-door stainless steel base cabinet with stainless steel marine edge countertop with integral stainless steel sink. Nominal dimensions 30 inches wide x 24 inches deep x 36 inches high.
 - 5. Type SS5 Recessed Full Height Wall Cabinet: Carr 7358-36S 2-door stainless steel cabinet with glass doors. Nominal dimensions 36 inches wide x 18 inches deep x 83 inches tall.
- D. Acceptable Alternative Manufacturers and Products: Products equivalent in quality, dimensions, and features may be provided by one of the following manufacturers:
 - 1. Continental Metal Products, 800-221-4439, www.continentalmetal.com
 - 2. Southwest Solutions Group, 800-803-1083, www.southwestsolutions.com
 - 3. *Custom Stainless Products, Inc. (Addendum 3)*

2.2 STAINLESS STEEL HEALTHCARE CASEWORK

- 1. Stainless Steel Sheet: ASTM A 240/A 240M, Type 304, stretcher-leveled standard of flatness.
- 2. Nominal Stainless Steel Thicknesses:

- a. Sides, Ends, Fixed Backs, Bottoms, Cabinet Tops, Soffits, and Items Not Otherwise Indicated: 0.050 inch. Bottoms may be 0.038 inch if reinforced.
- b. Back Panels, Doors, Drawer Fronts and Bodies, and Shelves: 0.038 inch except 0.050 inch for unreinforced shelves more than 36 inches long.
- c. Intermediate Horizontal Rails, Center Posts, Tubular Legs, and Top Gussets: 0.062 inch.
- d. Drawer Runners and Hinge Reinforcements: 0.078 inch.
- e. Leveling and Corner Gussets: 0.109 inch.

2.3 GLAZING

- A. Tempered Glass: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; not less than 5.0 mm thick.

2.4 CASEWORK HARDWARE

- A. Provide healthcare casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

2.5 CASEWORK FABRICATION

- A. General: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Integrally frame and weld to form a dirt- and vermin-resistant enclosure. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch.
- B. Glazed Doors: Hollow-metal stiles and rails of similar construction as flush doors, with glass held in resilient channels or gasket material.
- C. Hinged Doors: Mortise doors for hinges and reinforce with angles welded inside inner pans or hollow-metal stiles at hinge edge.
- D. Metal Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal.
- E. Metal Shelves: Front, back, and ends formed down, with edges returned horizontally at front and back to form reinforcing channels.
- F. Shelf Supports: Provide clips, brackets, pilasters, or other means to support shelves from cabinet ends and to allow height of shelves to be adjusted in increments of not more than 2 inches.
- G. Toe Space: Unless casework is fully recessed, provide metal toe space, fully enclosed, 4 6 (*Addendum 3*) inches high by 3 inches deep, with no open gaps or pockets.

- H. Filler Strips: Provide as needed to close spaces between casework and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as casework and with hemmed or flanged edges.
- I. Trim Flanges: Formed metal trim fabricated from same material and with same finish as casework. Provide at perimeter of recessed cabinets.

2.6 STAINLESS STEEL FINISH

- A. Grind and polish surfaces to produce uniform, directional-satin finish matching ASTM A 480/A 480M, No. 4 finish, with no evidence of welds and free of cross scratches. Run grain with long dimension of each piece. ~~When polishing is completed, passivate and rinse surfaces.~~ (Addendum 3) Remove embedded foreign matter and leave surfaces clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of healthcare casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF HEALTHCARE CASEWORK

- A. Install casework level, plumb, and true in line; shim as required using concealed shims. Where healthcare casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
 - 2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet.
 - 3. Variation of Faces of Casework from a True Plane: 1/8 inch in 10 feet.
 - 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
 - 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
- B. Recessed Cabinets: Set cabinets in openings and fasten to partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- C. Base Cabinets: Fasten cabinets to partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 16 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through the back, near the top, at not less than 16 inches o.c. unless continuously hung from hanging strips.
- E. Install door and drawer hardware uniformly and precisely.

- F. Adjust operating hardware so doors and drawers align and operate smoothly without warp or bind and so contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish as approved by Architect.

END OF SECTION 123570

SECTION 124813- ENTRANCE FLOOR MATS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Entrance / walk-off mats.
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Requirements."
 - 2. Division 03 Section "Cast-in-Place Concrete" for coordination of recesses to accept entrance mat systems.
 - 3. Division 32 Section "Concrete Paving" for coordination of recesses to accept entrance mat systems.
- C. The materials in this Section are part of the overall requirements to comply with the performance and submittal requirements of the LEED Green Building Rating System.

1.3 SUBMITTALS

- A. Product data for each type of product specified, consisting of manufacturer's specification, technical data, and installation instructions.
- B. Shop Drawings: Shop drawings showing layout, fabrication and installation of each product, including anchorage details, rough-in details. Show the following:
 - 1. Carpet tile type, color, and dye lot.
 - 2. Type of subfloor.
 - 3. Type of installation.
 - 4. Pattern of installation.
 - 5. Pattern type, location, and direction.
 - 6. Installation method (monolithic, quarter turn, ashlar, brick random, interactive patterning).
 - 7. Type, color, and location of insets and borders.
 - 8. Type, color, and location of edge, transition, and other accessory strips.
 - 9. Transition details to other flooring materials.
- C. Samples: Full size sample
- D. Maintenance data.

1.4 LEED SUBMITTAL REQUIREMENTS

- A. Complete the LEED Materials Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- B. Cut sheets or other documentation for each product/material highlighting recycled content information.
- C. Cut sheets or other documentation for each product/material highlighting location of manufacture and harvest/extraction if within 500 miles of the project.
- D. Complete the LEED VOC Submittal Form as provided in Division 01 Section “Submittal Procedures” for products in this section.
- E. Cut sheets or MSDS from product manufacturer for each adhesive, sealant, paint and coating project used within the vapor barrier, highlighting the VOC content.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain floor mats through one source from a single manufacturer.
- B. Manufacturer Qualifications: Carpet manufacturer shall have no less than 5 years experience of producing recyclable carpet tile and shall have published product literature clearly indicating compliance with requirements of this section.
 - 1. Certification: ISO 9001 and ISO 14001 certified manufacturer.
- C. Installer Qualifications: An installer with a minimum of 5 years commercial carpet installation experience, and who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- D. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with carpet manufacturer's installation recommendations and the Carpet & Rug Institute Installation Standard 2011 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. HVAC system should be operational and running prior to carpet installation and remain running after carpet installation.

- D. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to allow bond between adhesive and concrete. Concrete slabs should have moisture and pH readings that are within the specified tolerance of the adhesive to be used.

1.8 COORDINATION

- A. Install entrance matting after finishing operations, including painting and ceiling work has been completed.

PART 2 - PRODUCTS

2.1 ENTRANCE / WALK-OFF MATS

- A. Manufacturer: PatCraft from Shaw. 800-241-4014. www.patcraft.com

- 1. Product: Beyond the Door 10317 Prado
 - a. Construction: Eco Solution Q4 multi-level pattern loop, 100% solution dyed.
 - b. Tufted Pile Height: 6/32" high, 3/32" low.
 - c. Tufted Yarn Weight: 32 ounces.
 - d. Density: 8000
 - e. Size: 24' x 24"
- 2. Colors: See Finish Schedule on Drawings for colors and patterns.

- B. Performance Characteristics: As follows:

- 1. Critical Radiant Flux Classification, Flooring Radiant Panel ASTM E 648: Not less than 0.45 W/sq. cm.
- 2. Smoke Density: Less than 450 per ASTM E662.
- 3. Methanamine Pill Test CPSC FF1-70: Must pass pill test.
- 4. Tuft Bind: Not less than 8 lbf (36 N) according to ASTM D 1335.
- 5. Delamination: Not less than 3.5 lbf/in. according to ASTM D 3936.
- 6. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
- 7. Dimensional Stability: 0.119 percent or less according to ISO 2551 (Aachen Test).
- 8. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 129 and AATCC 164.
- 9. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.
- 10. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.
- 11. Emissions: Provide carpet tile that complies with testing and product requirements of Carpet & Rug Institute's "Green Label Plus" program.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

- B. Trowelable Adhesives: Water-resistant, mildew-resistant, nonstaining, premium grade, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation such as Shaw 5000 or Shaw 5100 or available equivalent where slab moisture does not exceed 85 percent per ASTM F 2170 or 5 lbs per ASTM F 1869. Where slab moisture does not exceed 85 percent and antimicrobial protection is needed to pass AATCC 174, use Shaw 5036. Where moisture exceeds 85 percent or 5 lbs but does not exceed 90 percent or 10 lbs, use Shaw 5900 or available equivalent.
1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 3. Adhesives shall comply with the testing and product requirements of the Carpet and Rug Institute Green Label Plus Program.
- C. Non-Trowelable Adhesive: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation such as LokDots where slab moisture does not exceed 95 percent per ASTM F 2170 or 10 lbs per ASTM F 1869. Each carpet tile must be adhered to the subfloor.
- D. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects prior to installation. See manufacturer's requirements for substrate conditions and ambient conditions.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing moisture and pH tests as recommended by carpet tile manufacturer.
 2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.

3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
4. Lightweight concrete and gypcrete subfloors may require a primer such as Shaw 9050 or equivalent to reduce surface porosity.
5. Where previous surface treatments are unknown, or where other concerns exist as to the ability of the adhesive to bond to the substrate, a 24 hour bond test is recommended.

3.2 PREPARATION

- A. General: Comply with Carpet & Rug Institute Installation Standard 2011, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds that contain a cementitious base with a latex additive, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with Carpet & Rug Institute installation Standard 2011, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive, such as LokDots. Any non-spreadable adhesive system must adhere the carpet to the substrate.
- C. Maintain dye lot integrity. Do not mix dye lots in same area unless the specific carpet style is manufactured as a merge-able dye lot product.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.
- H. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- I. Roll the entire installation with a 75 lb roller once installation is completed.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with Carpet & Rug Institute Installation Standard 2011, "Protecting Indoor Installations."
- C. When construction or move-in activities will continue where new carpet is installed, provide non-staining building material paper to protect carpet. Do not use plastic sheeting as it can trap moisture, and self-sticking plastic sheeting can transfer adhesive residue to carpet that will attract soil.
- D. When heavy objects are moved over carpet within 24 hours of installation, use plywood over carpet to prevent buckling and wrinkling.
- E. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 124813

SECTION 142400 – MACHINE ROOMLESS ELEVATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and supplemental provisions of Contract, including General and other Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. Section includes machine roomless passenger elevators.
- B. Elevator Car: Provide finished passenger elevator car including furnishing and installing the following:
 - 1. Car wall finishes including trim.
 - 2. Car floor finishes.
 - 3. Car ceiling finishes.
 - 4. Car door finishes.
 - 5. Car door sills.
 - 6. Car light fixtures.
 - 7. Handrails.
 - 8. Cutouts and other provisions for installing elevator signal equipment in cars.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.
- B. Service Elevator: A passenger elevator that is also used to carry freight.

1.4 ACTION SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment.
 - 2. Include large-scale layout of car-control station and standby power operation control panel.
 - 3. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
 - 4. Indicate fire rating of the elevator door entrance citing applicable testing data.
 - 5. Submit shop drawings to the local jurisdiction having authority for approval.
- C. Samples for Initial Selection: For finishes involving color selection.

- D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes; 3-inch square Samples of sheet materials; and 4-inch lengths of running trim members.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in Operation, and Maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard five-year maintenance agreement, starting on date of Substantial Completion. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.9 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate locations and dimensions of other work relating to machine roomless elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.10 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide EcoSpace 4000 as manufactured by KONE or comparable product by one of the following:
 - 1. Otis Elevator Company.
 - 2. American Crescent Elevator Mfg., Corp.
 - 3. Fujitec America, Inc.
 - 4. Minnesota Elevator, Inc.
 - 5. Mowrey Elevator Co.
 - 6. Schindler Elevator Corp.
 - 7. Schumacher Elevator Co.
 - 8. ThyssenKrupp Elevator

- C. Source Limitations: Obtain elevators from single manufacturer.
 - 1. Major elevator components, including motors, counterweights, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.
- C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator safety requirements for seismic risk Zone 2 or greater in ASME A17.1/CSA B44.
 - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 - 2. Affected peak velocity acceleration (A_v) for Project's location is greater than or equal to 0.20 (seismic risk Zones 3 and 4).
 - 3. Provide earthquake equipment required by ASME A17.1/CSA B44.
 - 4. Provide seismic switch required by ASCE/SEI 7.
 - 5. Design earthquake spectral response acceleration short period (S_d s) for Project is to be completed by structural engineer licensed in the State of Washington.
 - 6. Project's Seismic Design Category: D.
 - 7. Elevator Component Importance Factor: 1.0.

2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description:
 - 1. Type: Machine Roomless.
 - 2. Rated Load: 4000 lb.
 - 3. Freight Loading Class for Service Elevators: Class A.
 - 4. Rated Speed: 150 fpm.
 - 5. Operation System: Single automatic.
 - 6. Number of Stops: Three
 - 7. Auxiliary Operations:
 - a. Standby power operation.
 - b. Automatic dispatching of loaded car.
 - c. Nuisance call cancel.
 - d. Independent service for service elevator.

- e. Loaded-car bypass.
- 8. Car Enclosure: Front Opening, Right and Left Door Arrangement.
 - a. Car Height: 9'-0".
 - b. Front and Rear Walls (Return Panels): Stain stainless steel, No. 4 finish with integral car door frames.
 - c. Car Fixtures: Satin stainless steel, No. 4 finish.
 - d. Side Wall Panels: Satin stainless steel, No. 4 finish.
 - e. Reveals: Satin stainless steel, No. 4 finish.
 - f. Door Faces (Interior): Satin stainless steel, No. 4 finish.
 - g. Door Sills: Aluminum, mill finish.
 - h. Ceiling: Satin stainless steel, No. 4 finish
 - i. Ceiling height: 8'-4".
 - j. Handrails: 1-1/2 inches round satin stainless steel, No. 4 finish at sides and rear of car.
 - k. Floor prepared to receive resilient flooring (specified in Division 09 Section "Resilient Sheet Flooring").
- 9. Hoistway Entrances:
 - a. Width: 36 inches.
 - b. Height: 96 inches.
 - c. Type: Single-speed side opening.
 - d. Frames: Satin stainless steel, No. 4 finish.
 - e. Doors: Satin stainless steel, No. 4 finish.
 - f. Sills: Aluminum, mill finish.
- 10. Hall Fixtures: Satin stainless steel, No. 4 finish.
- 11. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
 - b. Provide hooks for protective pads and one complete set(s) of full-height protective pads.

2.4 MACHINES AND COMPONENTS

- A. Machine Locations: Provide elevator machinery and components designed for location as indicated on Drawings, within the space as shown.
- B. Electrical Controller Unit D: Provide electro-magnetic type control equipment. Support panels on steel frames for either floor (free-standing or wall mounting) to meet NECA clearance requirements. Provide equipment designed to control starting and stopping, and to protect the motor from damage due to rest in the event of safety device operation or other possible events which might result in malfunction of elevators.

- C. Equip controller unit with electrical and electronic devices needed to perform the specified operations of the elevator or group of elevators. Use flame-resistant wiring, neatly formed and tied to panels.
- D. Guide Rails: Provide steel rails, supports and fasteners, complying with Code.
- E. Buffers and Bumpers: Provide oil-type or spring-type buffers, or bumpers as required by and complying with Code.
- F. Automatic Leveling Device: Equip each elevator with manufacturer's standard automatic leveling device, which will automatically position the stopping car within the following tolerance, regardless of travel direction, load or change in load: within 1/4" of landing floor level.
- G. Locks for Hoistway and Car Doors: Provide locks, electrical contacts and interlocks on hoistway doors and car doors, as required and complying with Code. Include keyed access provisions for inspection, maintenance, emergency entrance and fire department use.
- H. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and thereby, eliminate the sources of structure-borne noise resulting from the elevator system. Provide resilient care mounting (suspension) to isolate passenger cars from machine vibrations.
- I. Inserts: Furnish inserts to the Contractor to be installed in accordance with the elevator shop drawings during the construction of the hoistways, pits and machine rooms for the installation of machines, rails, rail supports or bracing, hoistway entrances and other elevator components requiring inserts for anchorage or support.
- J. Power Door Operators: Provide power door operator on each car door, to automatically open and close both the car door and hoistway door simultaneously, complying with Code. Provide unit with maximum door travel speed of not less than 2.5 ft. per sec., with checked speed at both limits of travel. Arrange unit button-operation from within car, operable when car is stopped or stopping at landing.
- K. Manufacturer Service Tool: Manufacturer to provide software and miscellaneous hardware to connect laptop computer or service tool to hoistway equipment for maintenance and service.

2.5 OPERATION SYSTEMS

- A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
- B. Security Features: Provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.
 - 1. Car-to-Lobby (main floor) Feature: Feature activated by keyswitch at main lobby that causes car to return immediately to lobby and open doors for inspection. On

deactivation by keyswitch, calls registered before keyswitch activation are completed and normal operation is resumed.

2.6 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.7 EMERGENCY RETURN

- A. A battery operated emergency return device shall be provided to prevent passengers from being trapped in the elevator in the event of either a power outage or single phase condition. In such event, the elevator shall automatically return to the bottom floor and provide a door operation, after which the elevator shall be shut down with its doors closed but subject to door operation from within the car.
- B. The emergency return power supply unit is to be powered by suitable batteries that are automatically maintained at full charge with the charging voltage regulated.

2.8 CAR ENCLOSURES

- A. General: Provide steel-framed car enclosures with non-removable wall panels, with car roof, access doors, power door operators, and ventilation.
 - 1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
 - 1. Subfloor: Exterior, underlayment grade plywood, not less than 5/8-inch nominal thickness.
 - 2. Stainless-Steel Wall Panels: Flush, hollow-metal construction; fabricated from stainless-steel sheet.
 - a. Basis of Design Wall Finish: KONE satin stainless steel.
 - 3. Fabricate car with recesses and cutouts for signal equipment.
 - 4. Fabricate car door frame integrally with front wall of car.
 - 5. Stainless-Steel Doors: Flush, hollow-metal construction.
 - a. Basis of Design Door Finish: KONE satin stainless steel.
 - 6. Sight Guards: Provide sight guards on car doors matching door edges.
 - 7. Sills: Extruded metal, with grooved surface, 1/4 inch thick.

8. Metal Ceiling: Flush panels, with six low-voltage LED downlights. Align ceiling panel joints with joints between wall panels.
 - a. Basis of Design Ceiling Finish: KONE LF-88 satin stainless steel.
9. Handrails: Manufacturer's standard handrails, of shape, metal, and finish indicated.
 - a. Basis of Design Handrail: KONE 2 inch flat satin stainless steel.

2.9 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard 2-speed side opening horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
 1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252.
 1. Fire-Protection Rating: 1-1/2 hours with 30-minute temperature rise of 450 deg F.
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
 1. Stainless-Steel Frames: Formed from stainless-steel sheet.
 2. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 inches high, on both inside surfaces of hoistway door frames.
 3. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated by laminating stainless-steel sheet to exposed faces and edges of enameled cold-rolled steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
 4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

2.10 SIGNAL EQUIPMENT

- A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with LEDs.
 1. Basis of Design Signalization: KONE KSS 140.
- B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.

1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Swing-Return Car-Control Stations: Provide car-control stations mounted on rear of hinged return panel adjacent to car door and with buttons, switches, controls, and indicator lights projecting through return panel but substantially flush with face of return panel.
1. Mark buttons and switches for function. Use both tactile symbols and Braille.
 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- D. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- E. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' two-way telephone communication service.
- F. Car Position Indicator: Provide digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- G. Hall Push-Button Stations: Provide one hall push-button station at each landing.
1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
 2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.
- H. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide one of the following:
1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
- I. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
1. At manufacturer's option, audible signals may be placed on cars.
- J. Hall Position Indicators: Provide digital-display-type position indicators, located above entrance at ground floor. Provide units with flat faceplate for mounting and with body of unit recessed in wall.

1. Integrate ground-floor hall lanterns with hall position indicators.
- K. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed.
- L. Fire-Command-Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby power elevator selector switch(es), as required by ASME A17.1/CSA B44, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.
- M. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

2.11 FINISH MATERIALS

- A. General: Provide the following materials for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- C. Stainless-Steel Bars: ASTM A 276, Type 304.
- D. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Perform work with competent mechanics skilled in this work and under the direct control and supervision of the elevator manufacturer's experienced foreman.
- B. Set hoistway entrances in alignment with car openings and true with plumb sill lines.

- C. Install machinery, guides, controls, car and equipment and accessories in accordance with manufacturer's instructions, applicable codes and standards to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.
- D. Mount machine adjacent to hoistway on concrete slab. Isolate and dampen machine vibration with properly sized sound-reducing anti-vibration pads.
- E. Install and hook-up piping between machine and cylinder.
- F. Erect hoistway sills, headers and frames prior to erection; of rough walls and doors; erect fascias and toe guards after rough walls are finished.
- G. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.
- H. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- I. Lubricate operating parts of systems as recommended by manufacturers.
- J. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- K. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.
- L. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- M. Locate hall signal equipment for elevators as follows, unless otherwise indicated:
 - 1. Place hall lanterns either above or beside each hoistway entrance.
 - 2. Mount hall lanterns at a minimum of 72 inches above finished floor.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 PROTECTION

- A. Temporary Use: Comply with the following requirements for each elevator used for construction purposes:
1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
 2. Provide strippable protective film on entrance and car doors and frames.
 3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
 4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
 5. Do not load elevators beyond their rated weight capacity.
 6. Engage elevator Installer to provide a five year maintenance service agreement. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
 7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevators.
- B. Check operation of each elevator with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.6 CLEAN-UP

- A. Prior to final acceptance, remove protection from finished or ornamental surfaces and clean and polish surfaces with due regard to type of material.
- B. At completion of work of this Section, remove tools, equipment and surplus materials from site.

3.7 ADJUST AND BALANCE

- A. Make necessary adjustments of equipment to ensure elevator operates smoothly and accurately.

END OF SECTION 142400