

Behavioral Health: Community Civil 48 Bed Capacity

STATE OWNED, MIXED USE - PRE-DESIGN REPORT - PROTOTYPE BUILDING

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SW- BH Community 48 Bed Capacity Community Based Behavioral Health Facilities

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Executive Summary

PROTOTYPE, 48-BED STATE-OWNED COMMUNITY CIVIL FACILITY

Summarize the Problem

Governor Inslee laid out his vision to provide mental health services in local communities for people with acute mental illness in the 2019 Legislative Session. Serving people in their home communities is essential to this plan. The transformation requires development of a continuum of services that can prevent or divert people from being committed to the state hospitals and can support people in their recovery after treatment in a hospital is complete.

Governor Inslee and the Legislature are spurred by Washington's rank of 47th in the nation in capacity for appropriate mental health services. Compared to the rest of the country, Washington has a high prevalence of mental illness and low access to care. Within two years, the state will need almost 370 more civil beds than our current capacity.

The state is at the beginning of a major reform of the entire behavioral health service delivery model. The large state hospitals will evolve into a Center of Forensic Excellence through phased renovation and the construction of new hospitals designed with a new model for mental health care.

Other state agencies and the University of Washington have also been funded and charged with the responsibility to increase the number of psychiatric services such as housing.

DSHS' Commitment to Community-Based Treatment

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment facilities.

These facilities would provide a range of services to people as they move through the treatment regimen: evaluation and treatment, 90-day to 180-day intensive treatment, and a step-down program to ready people for their return to home and work. The department submitted to the Legislature a "preliminary predesign" for one of the 48-bed facilities by December 31, 2019.

Current State of Civil Commitment At Western State Hospital

Western State Hospital (WSH) was budgeted for 527 civil commitment beds through July 2019. In August 2019, 60 civil commitment beds were taken off line for conversion to forensic capacity. Now only 487 beds remain available for civil commitments.

Projected Need for Civil Commitment Beds in Washington

Based on the report submitted to the Legislature in December 2018, the projected need for civil capacity beds that provide services for people who have 90-180 day commitments is 934 in 2021 and increases to 980 in 2025. Refer to Appendix G, "Report to the Legislature: Predicting Referrals for Competency, 12/1/18" for a copy of the full report.

Future State of Civil Commitment At Western State Hospital

The expectation of the governor and the legislature is a gradual decrease in the number of civil commitments at WSH as additional resources are introduced through community-based facilities.

Decentralization of civil commitments supports goals set by the governor and the legislature to create additional forensic psychiatric capacity on the grounds of WSH. This includes the design and building of a new forensic hospital and the establishment of a program that supports a forensic center of excellence.

Future State of Community-Based Civil Commitments in Washington

This project constructs a state-operated 16-bed program for civil commitment, a privately-operated 16-bed program for civil commitment, and a privately-operated step-down transition program for those needing additional support prior to returning to the community.

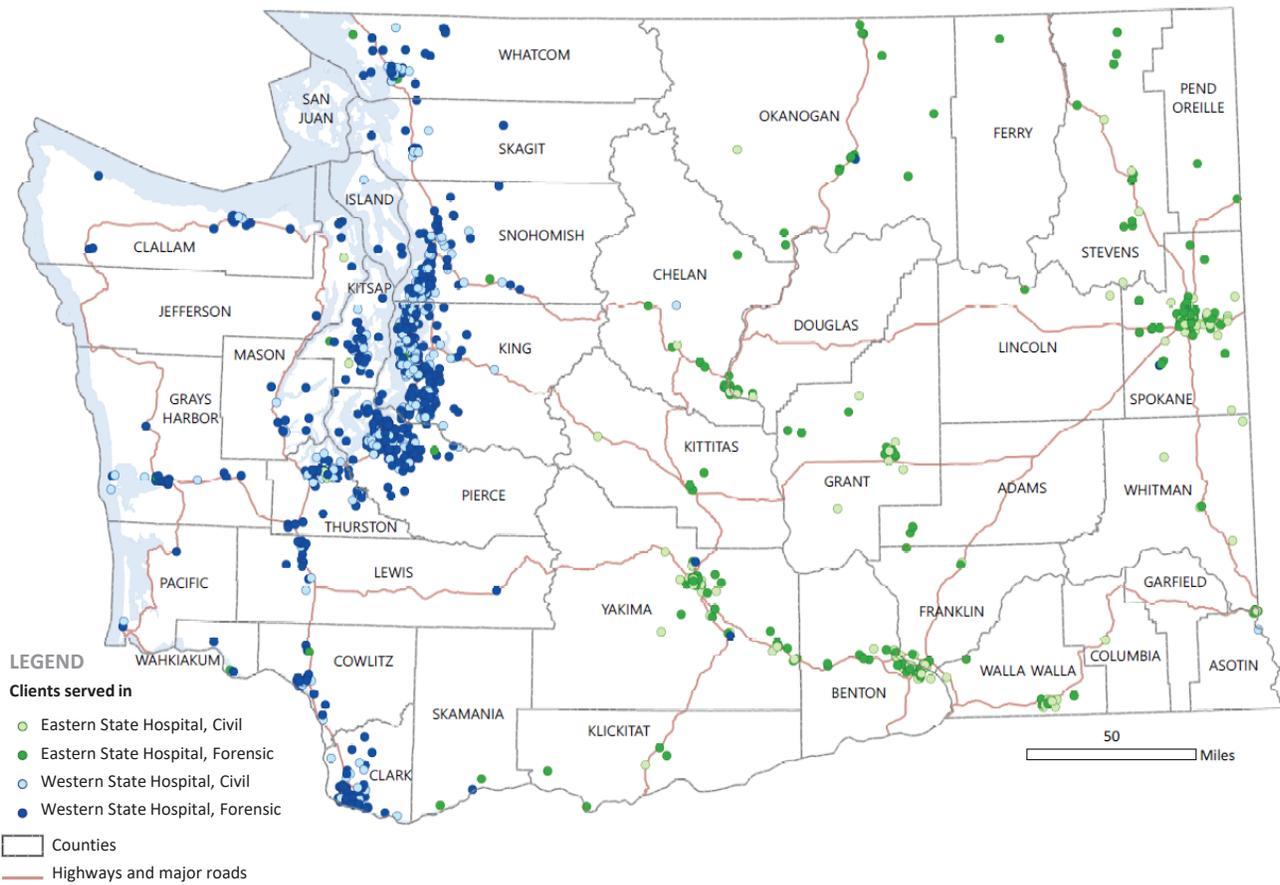
Other investments made by the legislature to create civil commitment capacity include operating funds that were provided to the Health Care Authority and a directive to contract for civil commitment beds. These legislative investments are projected to result in 275 beds for long term (90 and 180 days) commitments by 2023.

Location of new facilities will be made in part based on regional need. While all western Washington regions need capacity, the recent closure of the only residential treatment facility in Clark County has resulted in no access to civil care in the Southwest Region. This is the only Western Washington Region without any civil capacity.

State County Map 1-1

This map shows the home community from which the civil and forensic patients are coming from and at which state facility they are receiving mental health services.

Persons Served at State Hospitals, CY 2018

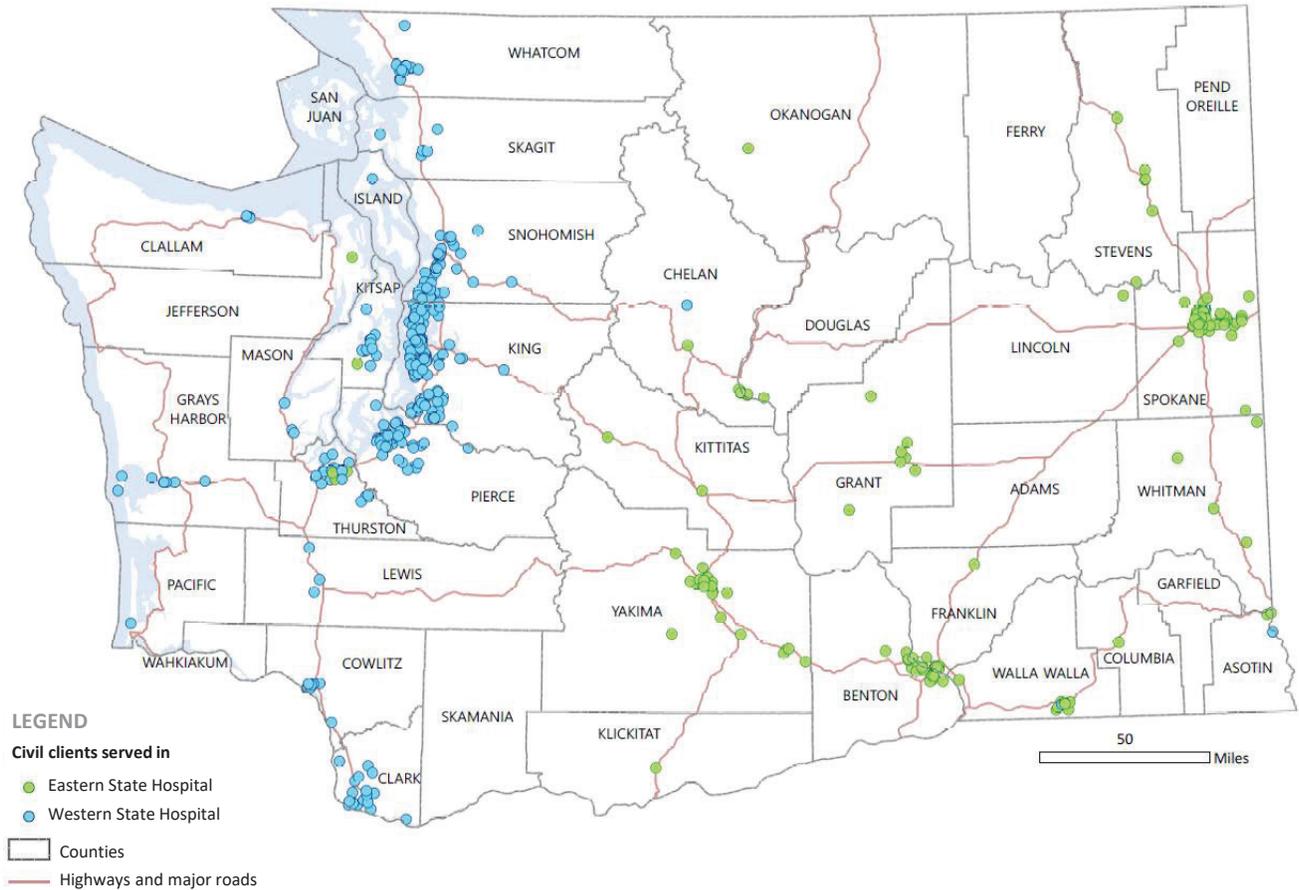


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State County Map 1-2

This map shows the home community from which civil patients are coming from and at which state facility they are receiving mental health services. Note the high concentration in Snohomish, King, Pierce, Thurston and Clark Counties. This data was a significant contributing factor in determining the Preferred Alternate.

Persons Served at State Hospitals, CY 2018, Civil

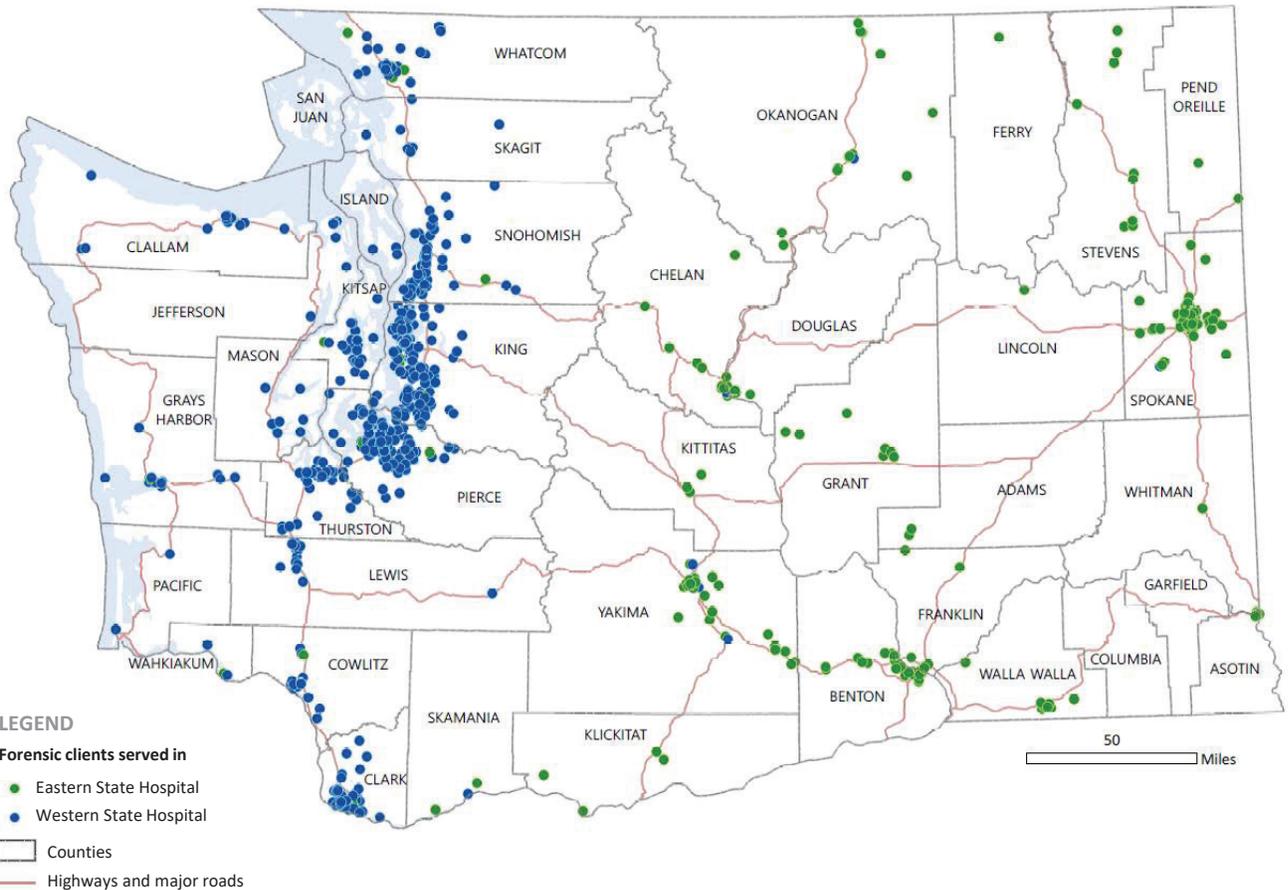


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State County Map 1-3

This map shows the home community from which forensics patients are coming from and at which state facility they are receiving mental health services. These patients will continue to receive treatment at the state hospitals.

Persons Served at State Hospitals, CY 2018, Forensic



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Alternatives Considered

This predesign report studies two prototype configurations for the 48-bed capacity community facility with the intention that they could be placed on a typical site throughout the state of Washington.

Alternative 1 - No Action - No New 48-bed Facility

Alternative 2 - Three, single-story facilities

The team reviewed how the adjacencies of three, single-story facilities would be best configured to support the intended uses and treatments for patients and staff.

Alternative 3- One, two-story facility and one, single-story facility

The team reviewed how preferred adjacencies would be revised in a two-story facility configuration along with one, single-story facility. This was studied in the case that a preferred site was suited for a vertical facility.



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Problem Statement

PROTOTYPE, 48-BED STATE-OWNED COMMUNITY CIVIL FACILITY

Approach Summary

In September of 2019, DSHS and the BCRA/BWBR lead design team convened a series of meetings to develop programming and concept design for 16 and 48-bed community-based facilities. These facilities will provide inpatient residential treatment for civilly-committed patients. The 48-bed campus will be comprised of three 16-bed facilities.

The design team was asked to evaluate six areas in Western Washington as possible sites for the new facilities. Three types of program offerings were discussed:

Evaluation and Treatment Facility (E&T) - the E&T facility is an involuntary inpatient facility for individuals who have been civilly committed to receive mental health treatment in a secure acute environment for a period of 14 to 30 days. Patients often have significant psychiatric issues like active psychosis and suicidal ideation.

90 to 180 Day Facility the 90 to 180-day facility is an involuntary in-patient facility for individuals who have been civilly committed to receive mental health treatment in a secure acute care environment for a period of 90 to 180 days. These individuals may have

completed treatment in an E&T but require further treatment prior to being returned to their community.

In contrast to the E&T, the 90 to 180 day will have large spaces for activity/life skills/exercise space to keep patients engaged for the longer stay and to help teach life skills that will help transition patients back into the community. These services are not currently provided in Washington outside of the State Hospitals.

Step Down Facility - the Step-Down facility is a voluntary in-patient facility for individuals who have been civilly committed to receive mental health treatment in a secure acute environment. These individuals may have completed treatment in an E&T and a 90 to 180 day but require further treatment prior to being returned to the community. These individuals can leave to go to medical appointments or leave the facility to receive additional off-site services but would return to the facility after their appointment.

The step-down facility, similar to the 90 to 180 day will have large spaces for activity/life skills /exercise space to keep patients engaged for the longer stay. This program is designed to transition the recovered civilly committed patient to the community.

Definition of Problems and Opportunities

The State of Washington has a unique opportunity to not only improve access to behavioral health services by providing more capacity, but to reduce the stigma associated with mental illness by creating a more effective treatment model.

The design team and key DSHS stakeholders researched industry best practices. One area of focus was looking at how the built environment impacts levels of aggression and acts of violence within behavioral health facilities. In a review of 122 studies conducted in 11 countries, researchers found that up to one-third of patients admitted to a behavioral health facility will engage in some form of aggressive or violent behavior during their stay. Often, this aggression or violence results in injuries to staff or other patients. Recent research by environmental psychologists have started to reveal strong correlations between the physical environment and the aggressive or violent behaviors.

Design Strategies proven to reduce patient aggression or violence:

Improved sight-lines

- Community spaces and patient room doors observable from central location
- Removal of hiding places/alcoves
- Visual connections between staff within facility

Positive distractions that reduce stress

- Outdoor areas accessible to patients
- Views to nature or nature-based artwork
- Access to natural daylight

Reduction of environmental stressors

- Elimination/reduction of environmental clutter, harsh noise and artificial lighting
- Design for control within patient rooms (music, lighting color/intensity, etc.)

Design for low spatial/social density

- Single patient rooms with private toilets
- Minimize bottle-necks/areas of constriction
- Smaller community spaces designed for individuals in crisis
- Ample movable furniture in community spaces to allow patients to regulate relationships with others

Program Needs

The design team conducted an interactive workshop with key DSHS stakeholders to discuss:

- Unique patient characteristics and needs
- Staffing
- Space needs
- Key flows and adjacencies

During this workshop the design team reviewed several behavioral health archetypes and reviewed the pros/cons of each option, which became the basis for the concept plan.



Images from project team workshops held at BCRA Tacoma office

Development of Guiding Principles

The development of the Guiding Principles was a result of Visioning Session #2. The design team presented the DSHS stakeholders with examples of what other similar facilities use as their Guiding Principles, as well as how they have utilized them in the design process and beyond. The DSHS stakeholders agreed that Guiding Principles would help them stay on course with their vision and support them in their decision making. Throughout the day, key words, phrases and ideas were collected that resonated with the stakeholders. The design team took those ideas and generated the following Guiding Principles for this design process.

PATIENTS

Warm, residential environment that supports patient recovery and progress in their treatment.
A healing environment with a goal of zero injuries, where patients and staff are integrated in partnership.

FAMILIES

Families are welcomed and included. They are comfortable with the safety of their loved ones and themselves.

STAFF

The employer of choice where staff are supported, empowered, high-performing, and inspired. Staff are integrated with patients, safe from harm and confident in the protection of their privacy.

COMMUNITY

A Community Asset / Center of Wellness that invites community members into the facility to break down barriers and create partnerships while maintaining patient privacy.

STEWARDSHIP

Flexible, adaptable facilities intentionally designed to work today and into the future. Net-Zero energy capable for environmental stewardship.

**A facility for mental wellness
for staff, patients, family,
and community members.**

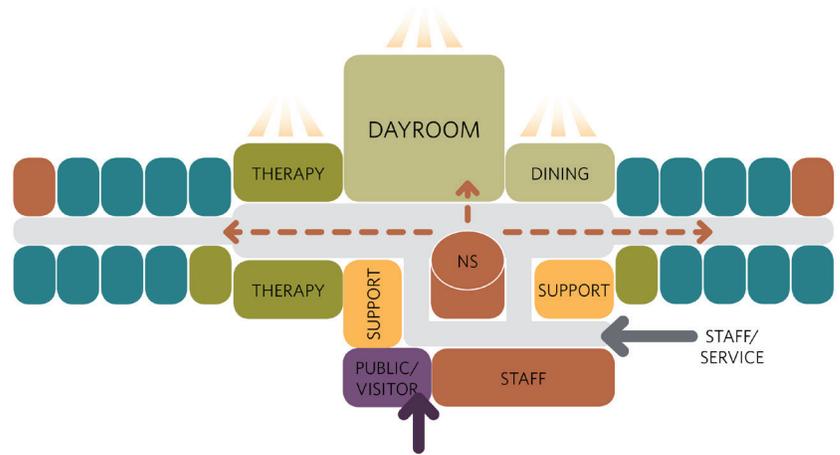


Floor Plan Diagram Options

During the visioning sessions, the project team looked through several prototypical adjacency diagrams to discover desired layout options.

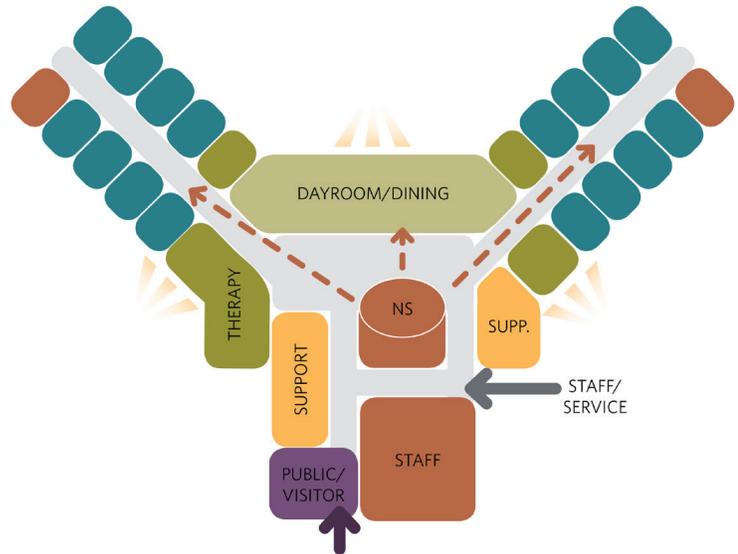
Option A

- (+) Good sightlines from nurse station
- (+) Access to daylight
- (-) Long straight corridor
- (+) Offices on the unit



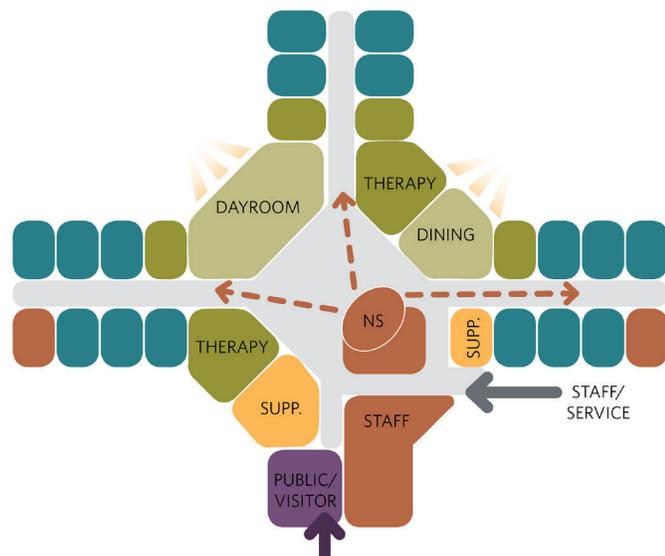
Option B

- (+) Sightlines from nurse station
- (-) Not able to see whole unit
- (+) Offices on the unit



Option C

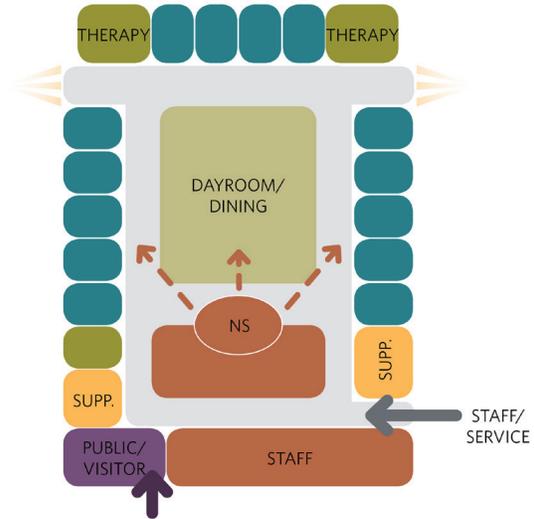
- (-) Not able to see whole unit
- (+) Offices on the unit
- (+) Multiple therapy areas



Floor Plan Diagram Options

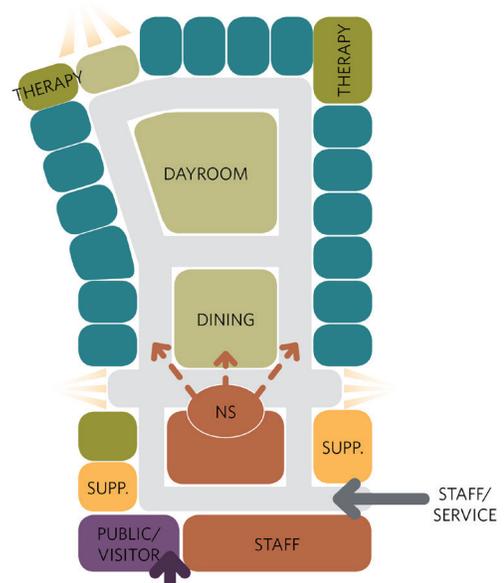
Option D

- (+) Able to always see whole unit
- (-) Limited access to daylight
- (-) Nurse station not as integrated
- (-) Large open floor plan
- (-) Offices located off the unit



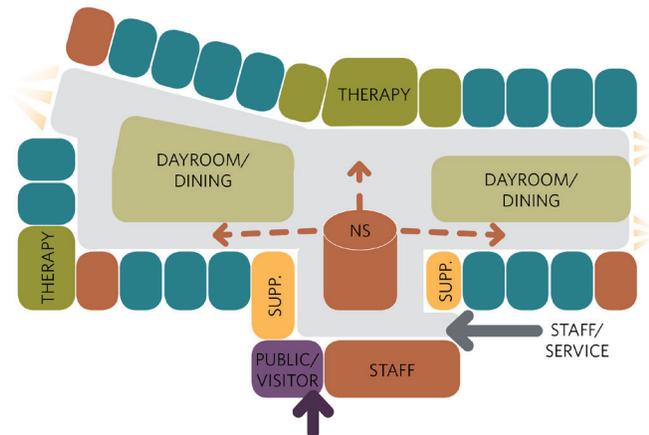
Option E

- (-) Nurse station not as integrated
- (+) Able to always see whole unit
- (-) Offices located off the unit



Option F (Preferred Option)

- (+) Good sightlines from nurse station
- (+) Able to always see whole unit
- (+) Multiple dayroom/dining spaces which can allow for different group sizes
- (-) Rooms that open directly onto the community spaces
- (+) Offices on the unit
- (+) Geometry that breaks up long corridors



Prototypical Space Plan

Concept Plan

The goal is to create a prototypical plan that would work well for each of the three treatment facilities: Evaluation and Treatment, 90-180, and Step-Down. Facilities will be highly flexible, allowing them to be easily adaptable to any other of these programs in the future. The proposed concept plan breaks the 16-bed facility down into two areas that allow staff to manage the patients' environment.

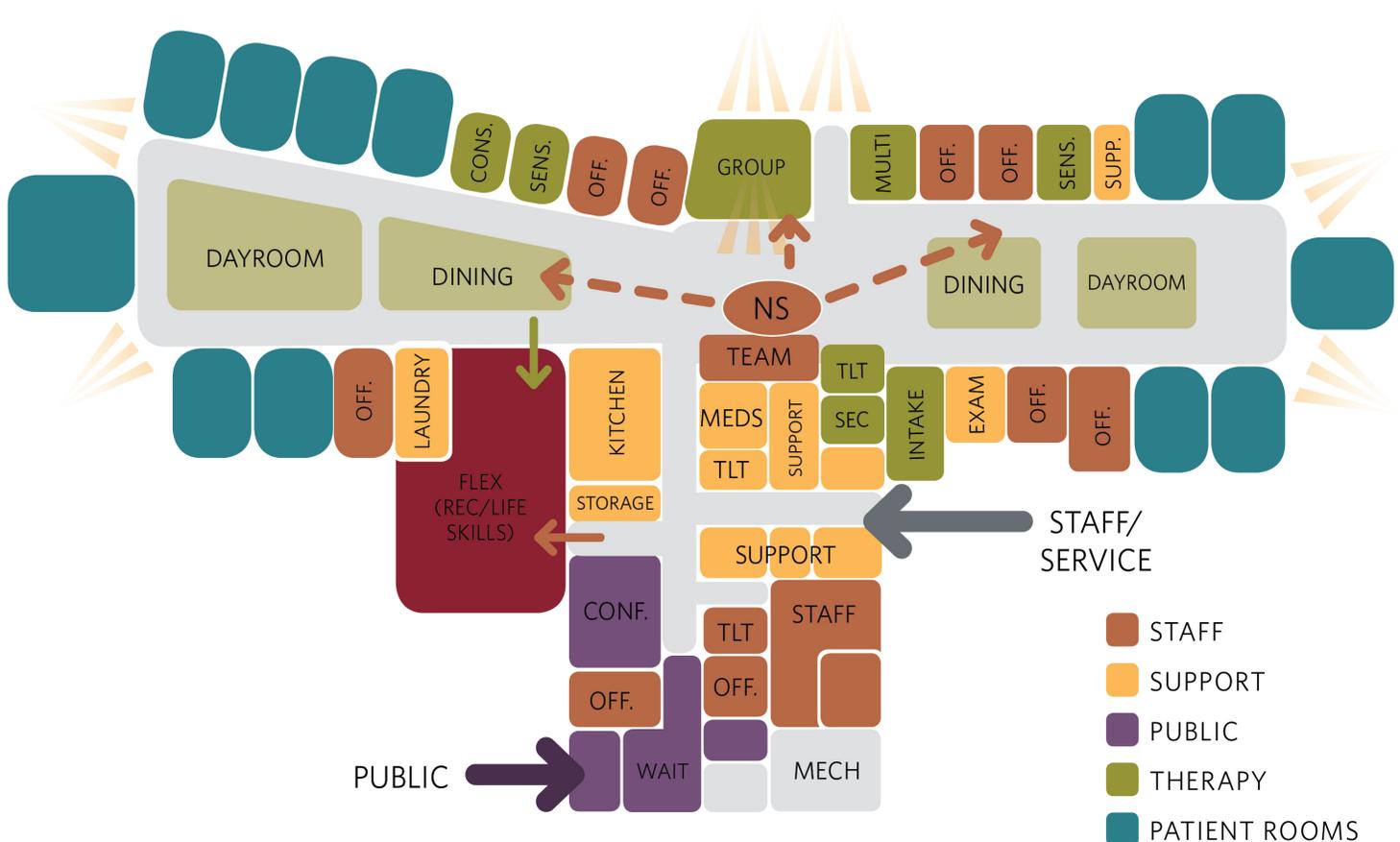
Other planning strategies include:

- Clear sight-lines to community spaces and patient room doors from central staff team area
- Creating multiple opportunities to bring natural light and views to the outdoors into the central community spaces
- Locating provider/therapist offices and private consult rooms centrally for improved staff efficiency
- Off-stage entry/circulation for staff and support functions (laundry, food service, etc.)

Pros
• Provides the most flexibility for future expansion or growth
• Less concern with vertical security
• More appealing to private operators
• Less operational infrastructure to support and maintain
• More roof surface area for solar panel system

Cons
• More land required which adds restrictions to potential site locations

Adjacency Diagram - single story



Two-Story Building Analysis

Concept Plan – 2 Story Option

As some of the potential building sites have a smaller footprint, a two-story building option was also developed. Currently federal requirements limit reimbursements for facilities with more than 16 licensed beds. The 90-180 day and Step-down facilities are licensed differently so these facilities could potentially be stacked rather than be separate, one-story buildings.

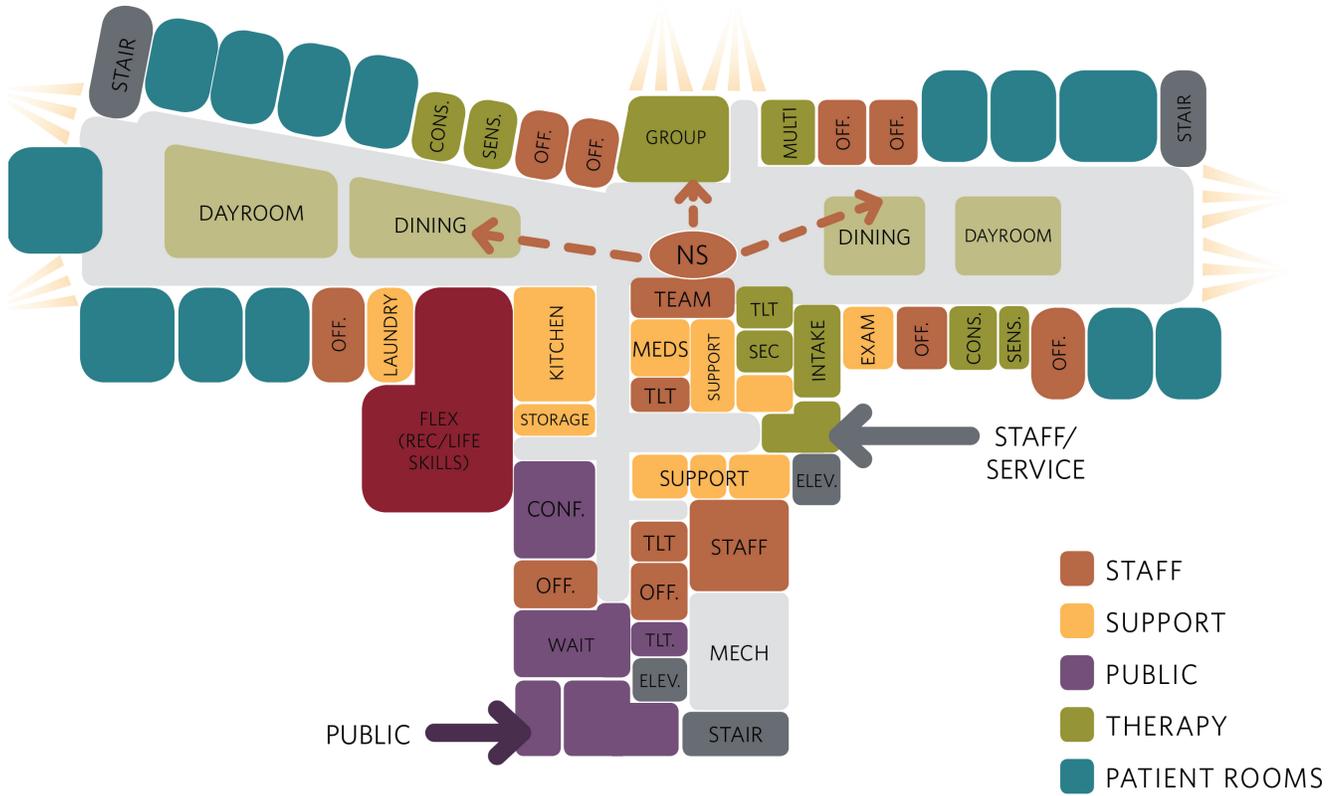
Pros

- Reduced building footprint accommodates smaller sites
- Potential to share Mechanical/Electrical systems
- Smaller roof surface reduces heating/cooling loss
- Properties greater than 1 acre are difficult to locate in urban areas.
- Communities are interested in efficient design to maximize available land.
- Staff familiarity between floors. If each floor is operated by the same organization, then staff can float between floors seamlessly.
- Greater views to outdoors

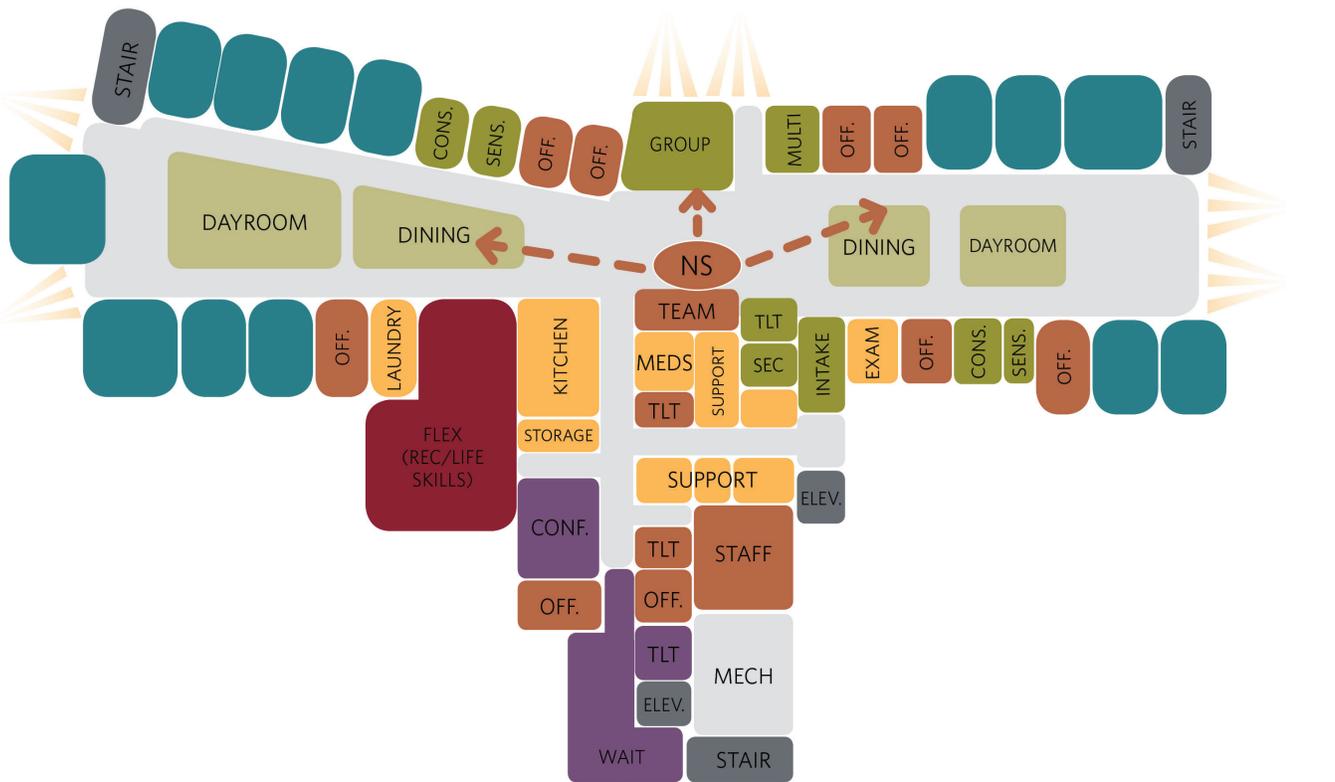
Cons

- The addition of stairs, elevators and shafts increase the overall building area – 38,000sf, 1350sf add per program
- Assume 2 elevators (one for visitors & one for service)
- Increased cost for elevators
- Increased construction costs
- Increased maintenance cost
- Potential staffing challenges escorting upper level patients to outdoor activity area
- Potential sightline/privacy concerns of upper patient outdoor area from ground level patient spaces
- Need to verify that the combined facility doesn't create an IMD
- Potential triggering more restrictive building code requirements – IBC construction type due to larger area
- Reduced roof area will impact solar array sizing

Adjacency Diagram Two Story option - Level One



Adjacency Diagram Two Story option - Level Two



SPACE PROGRAM

Room/Area	FGI Guidelines Reference	Safety Risk Level	Requested		Comments
			Unit	NSF	
Reception/Public Areas					430
Vestibule		1	1	120	120
Greeting Area/Family Lounge		1	1	180	180
Family Toilet		1	2	65	130
Patient Intake Area					695
Patient Intake		5	1	140	140
Patient Belongings		1	1	200	200
Laundry		5	1	80	80
Seclusion Room	2.1-2.4.3	5	1	100	100
Ante Room		5	1	100	100
Seclusion Toilet/Shower		5	1	75	75
Patient Lodging/Care Area					3,975
Patient Room, Private	2.5-2.2.2.2	4	10	160	1,600
Patient Room, Semi-Private	2.5-2.2.2.2	4	3	240	720
Toilet/Shower Room		4	13	75	975
Phone Alcove		3	3	10	30
Medications		1	1	120	120
Patient Laundry		3	1	150	150
Exam Room	2.1.3.2.2.1	2	1	140	140
Quiet/Sensory Room	2.5-2.2.4.3	3	2	120	240
Community/Program Areas					2,470
Consultation	2.5-2.2.6.13	3	1	120	120
Multi Purpose		3	1	120	120
Group Room, Large		2 or 3	1	300	300
Dayroom - Large		2 or 3	1	600	600
Dayroom - Small		2 or 3	1	300	300
Dining Area	2.5-2.2.8.2(b)	2 or 3	2	250	500
Re-heat Kitchen		1	1	320	320
Kitchen Storage		1	1	80	80
Toilet Room		4	2	65	130
Recreation/Life Skills					1,400
Yoga/Exercise		3	1	640	640
Storage		3	1	60	60
Teaching Kitchen		2	1	160	160
Common Area		2	1	320	320
Office Skills		2	1	120	120
Laundry		2	1	100	100
Support Areas					480
Clean Supply/Linen		1	1	100	100
Soiled Holding		1	1	100	100
Red Bag Waste		1	1	50	50
Housekeeping Closet		1	1	80	80
Equipment Storage		1	2	75	150
Staff Areas					2,380
Nursing/Staff Desk		2 or 3	1	140	140
Team Workroom		1	1	200	200
Office, Administrator		1	1	140	140
Office, Private		1	4	120	480
Office, Provider		2	1	120	120
Medical Records		1	1	150	150
Office, Flex		1	1	100	100
Office, Shared		1	1	150	150
Staff Toilet & Shower		1	2	80	160
Conference Room		1	1	300	300
Respite/Lactation		1	1	120	120
Staff Break		1	1	240	240
Staff Lockers		1	1	80	80
Mechanical					350
Subtotal					12,180
Total					17,661

Seating for 6-8. Includes space for family lockers. ADA accessible.

Assumes shelving for patient gowns & extra clothing. Should be located near central nurse/staff station. Locker/cabinet for each patient & area for luggage/oversized items. Alcove located between Intake area & Patient Belongings. Includes space for handwash sink, washer, dryer & bed bug oven

Space to store restraint chair/bed Accessible for intake without going through Seclusion room. Also used for urine collection - need water shut-off.

Includes platform bed, desk w/ chair, wardrobe and patient storage Includes platform bed, desk w/ chair, wardrobe and patient storage

1 phone + 2 video/app-based alcoves - observable from NS Includes space for medication dispensing units, medication cart, computer, small refrigerator, cabinet storage and countertop w/sink. Large laundry sink, 2 washers & dryers & folding counter. Exam/treatment table, sink, lockable storage cabinets, provider desk Assume 1 room located in each wing.

Multi-purpose room used as 2nd Consult room. Used for visitation & consults Multi-purpose space used for group/rec therapy, noisy activities & visitation. Assume counter w/ sink & cabinets for storage. Assume 2 separate spaces to reduce number of patients within a single space. Assume Dining areas are co-located with Dayrooms.

ADA accessible.

Table & Chairs for 8 3-4 computers Washer, dryer, sorting & ironing

Shelving for clean linen & personal hygiene supplies. No hopper sink required.

Mobility equipment, recreational equipment & etc.

All offices to be on unit except Business office Space for 2-3 4 workstations to chart, right sized to encourage staff to be on uni Program director, Nursing director, Clinical director, Business office MD or NP Tech workstation + shelving for records

2-3 desks for Rehab/Recreation & Social Services

Used for Treatment Planning & Staff Meetings. Sized for 12 people Small space w/ comfortable chair, dimmable light, small counter w/ sink & undercounter refrig Assumes space for table/chairs, full size refrig, microwave, coffee 8-10 staff during day. 6 evening. 4 overnight. Half sized lockers, not assigned.

Multiplier ranges from 1.40 - 1.50 GSF

Engineering Summary - Prototype Building

Introduction

There are a series of design elements that will be consistent regardless of knowing which final site is to be chosen for these facilities. The following are brief descriptions of the design approaches as they relate to the site, sustainability, mechanical, electrical, and plumbing designs.

Electrical Service

Each 16 Bed facility will be treated as an independent facility. Each 16 Bed will have its own utility service entrances for utility power, emergency power, telecommunications, cable television, internet, etc.

Normal power will be distributed to electric rooms in each facility and branch circuits will supply power to all electrical fixtures and devices from these electric rooms.

Essential Power

An optional power generator will be provided to pick up select building loads. The generator will be locally positioned to serve power directly and exclusively to this building. This generator will have a 96 hour fuel supply local to the generator.

Emergency Power (NEC Article 700) for egress and communications will be provided by a central battery inverter.

An Optional Power branch will be provided by the local generator through an automatic transfer switch and will serve total redundant power to the building.

Lighting

Lighting will be accomplished using LED lighting fixtures with features that allow dimming and in specific locations will be tunable for light color.

Ligature resistant lighting fixtures will be provided in all Patient accessible areas.

Tunable lighting will be provided in Sensory and Seclusion Rooms. Amber night lights will be provided in patient bedrooms.

Exterior lighting will be LED fixtures.

Lighting controls will vary from fully automatic lighting in public spaces using occupancy sensors and daylighting controls to (manual dimming) lighting control in patient rooms. All controls will be localized to the area of use. Patient rooms will have Staff override switching for lighting, whether it is to be global or local per room will be determined during building design.

Power Distribution

Individual building power panels will be provided.

Patient rooms and Seclusion rooms will not have receptacles installed.

Telecommunications

Each building will have a main distribution facility (MDF). Intermediate Distribution Facilities may be needed in the facility if the MDF is more than 200' from any location in the building. Multi-story facilities will have an IDF room on each floor. Cable will be based on CAT-6A cabling.

Wireless connectivity may be available to Patients, Staff, External Providers (Doctors) and Visitors over multiple wireless networks.

Television

- Television (TV) outlets will be provided in common areas, not in patient rooms in the 90-180 facilities.

Audio/Visual

- Patient rooms will be provided with music and ambient sound generators.
- The Multi-Purpose room will be provided with an Audio Visual (A/V) system including music and ambient sound generators.

Telecourt

- 90-180 facilities will have a Telecourt including cameras, televisions, data/voice and A/V systems.

Solar Power - Net-Zero Alternate

Solar photovoltaic (PV) power that would allow for 100% offset of the building's annual energy consumption will be planned as an alternate for the facilities. Lighting will be made 20% more efficient than the base. Connection to the building electrical system for distribution back to the electric utility will be provided.

Engineering Summary- Prototype Building

Fire Alarm

The Fire Alarm system will consist of a local main fire alarm panel in each building reporting back to the central campus fire alarm monitoring location over fiber for all DSHS campus facilities. Other locations will have full fire alarm systems with requirements determined for the specific facility during the building design.

Initiation devices will consist of smoke detectors located in strategic areas.

Notification appliances will consist of voice alarm speakers and visual alerting devices (Speaker/strobes).

The fire alarm system will need to be closely coordinated with the local Fire Marshal's office to provide a system that provides for a safe environment and is the least disruptive to the residents and staff.

E&T and 90-180 facility exterior doors will not unlock on Fire Alarm but will unlock on Fire Sprinkler Flow. Step-down facility exterior doors will not be locked.

Security

Security will include intrusion detection, access control, security video, panic alarms, and wander control. Security features for lockdown may also be anticipated. Panic Alarms will be provided in Nurse Station areas. Portable, worn on Staff, alerting and alarming systems will be provided as part of the Nurse Call system.

Nurse Call

Nurse Call will be provided to allow for two way voice communications between each Patient bed and the Nurse Station serving the bed. Each Patient bed will have a ligature resistant nurse call station including a staff assist pushbutton. Bath, Shower and Toilet rooms will have ligature resistant assistance call cords.

The nurse call system will provide portable Staff devices that will allow the staff to receive nurse calls while away from the Nurse Stations.

Wearable Staff duress alarms will be provided as part of the nurse call system.

Heating, Ventilation and Air Conditioning

The mechanical system will be comprised of a Variable Refrigerant Flow (VRF) system with a Dedicated Outdoor Air System (DOAS) for ventilation air. There will be three DOAS units serving the building delivering tempered ventilation air to individual Variable Air Volume (VAV) dampers at each space. This system provides for individual control in patient rooms and staff control in staff offices and common spaces. Ligature resistant supply and return grilles will be provided in all patient rooms.

Plumbing

Behavioral healthcare ligature resistant plumbing fixtures and floor drains are to be utilized for all areas throughout the building including Staff/ Service areas. Lavatories and water closets will be provided with low flow fixtures. Shower heads will utilize limited flow cartridges.

Sustainability

The facility will strive to provide an environmentally sensitive impact in keeping with the mission of this project to provide a safe, restorative and healing environment for those in need.

LEED V4 Silver minimum will be achieved for this project. The LEED items targeted are strategically selected to be minimal cost and highest benefit to the environment and building occupants.

Accountability to the executive order 18-01 will be achieved.

- Site selection to reduce carbon impacts – accounted for in this document
- Have a strategic technical consultant on the project
- Durable envelope design, efficient HVAC system with submetering and graphic dashboards is incorporated into 18-01 cost premiums
- Target low Embodied Carbon through project design and construction strategies
- Design for renewables and energy storage using solar photovoltaics (PV) to offset annual operational energy use, achieving net zero energy.

Site Design

The area around each building' will be designed to provide adequate storm water treatment and/or retention. The topography will be modified as minimally as required to provide proper drainage and natural landscaping elements.

Criteria to Evaluate Site for Project Implementation

Site Development/Permitting

Permitting

- Land Use Requirements - It is ideal if the site allows the 90-180 use outright. Second choice would be if a use permit process is required. Public Processes can be risky.
- Timeline to Achieve Building Permit
- Ability/Timeline for Jurisdiction to approve plans
- Master Plan Status - on site where it applies

Land Size and Configuration

- Evaluate if property shape and topography support desired building configuration and site circulation

Off Site Development Requirements

- Work with Authority Having Jurisdiction (AHJ) to determine extent of off-site improvements. This includes Jurisdiction-required right-of-way (ROW) improvements for items such as sidewalks, landscaping, curb, and gutter. Understand preliminary cost implications.

Utility Availability / Stormwater

- Study available utilities, electricity, water, sewer, gas, and communications. Determine preliminary connections, routing, and possible obstructions. Understand preliminary cost implications.
- Stormwater strategy - creating preliminary strategy for dealing with stormwater.

Site Amenities

Shared Facilities

- Is there an on-site kitchen or laundry that would provide services?

Transportation / Location

- How close is the site to I-5 or other major highways?
- Is the site accessible for families?
- Is public transportation available to the site?
- What is the distance from the site to Western State Hospital?

Vocation / Recreation space

- Are there existing vocational programs nearby?
- Is there adequate space for recreation activities?

Healing Environment

- Does the environment have access to nature?
- What is the feel of the adjoining neighborhood?

Purchased Services

- Are contracted food services available?
- Are contracted laundry services available?

Community Assets

Regional Need

- Does this location fit into the State's larger plan to provide community-based facilities?
- Would the location be near where there is a noted, significant need?

Access to Healthcare

- Can patients obtain dental, optical, and other healthcare services nearby?

Access to other Mental Health services

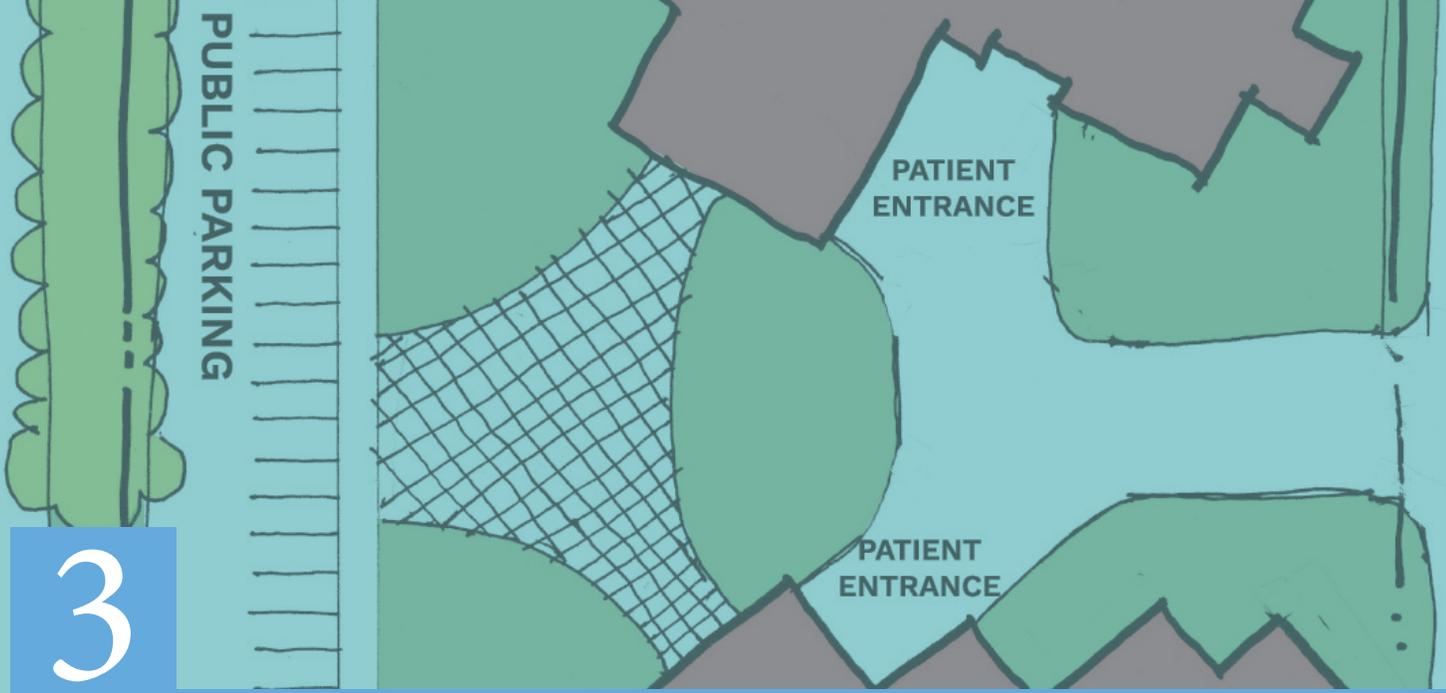
- What is the distance to the nearest E&T Facility?

Staff Availability

- Does the area around the chosen site have an adequate supply of potential employees?
- Would that availability serve the anticipated capacity?

Community Receptiveness

- Has the surrounding community communicated desire for this type of facility?
- Is the local leadership supportive of the project?



Analysis of Alternatives

PROTOTYPE, 48-BED STATE-OWNED COMMUNITY CIVIL FACILITY

Considered Alternates:

NA **Alternative 1 - No Action - No New 48-bed Facility**

A2 **Alternative 2 - Three, single-story facilities**
The team reviewed how the adjacencies of three, single-story facilities would be best configured to support the intended uses and treatments for patients and staff.

A3 **Alternative 3- One, two-story facility and one, single-story facility**
The team reviewed how preferred adjacencies would be revised in a two-story facility configuration along with one, single-story facility. This was studied in the case that a preferred site was suited for a vertical facility.



No Action Alternative #1

Alternate 1 - No Action-No new 48-bed Facility

The state will continue to provide treatment with the current number of beds that remains well below the need, while the need continues to increase. This current configuration does not serve the current model of care.

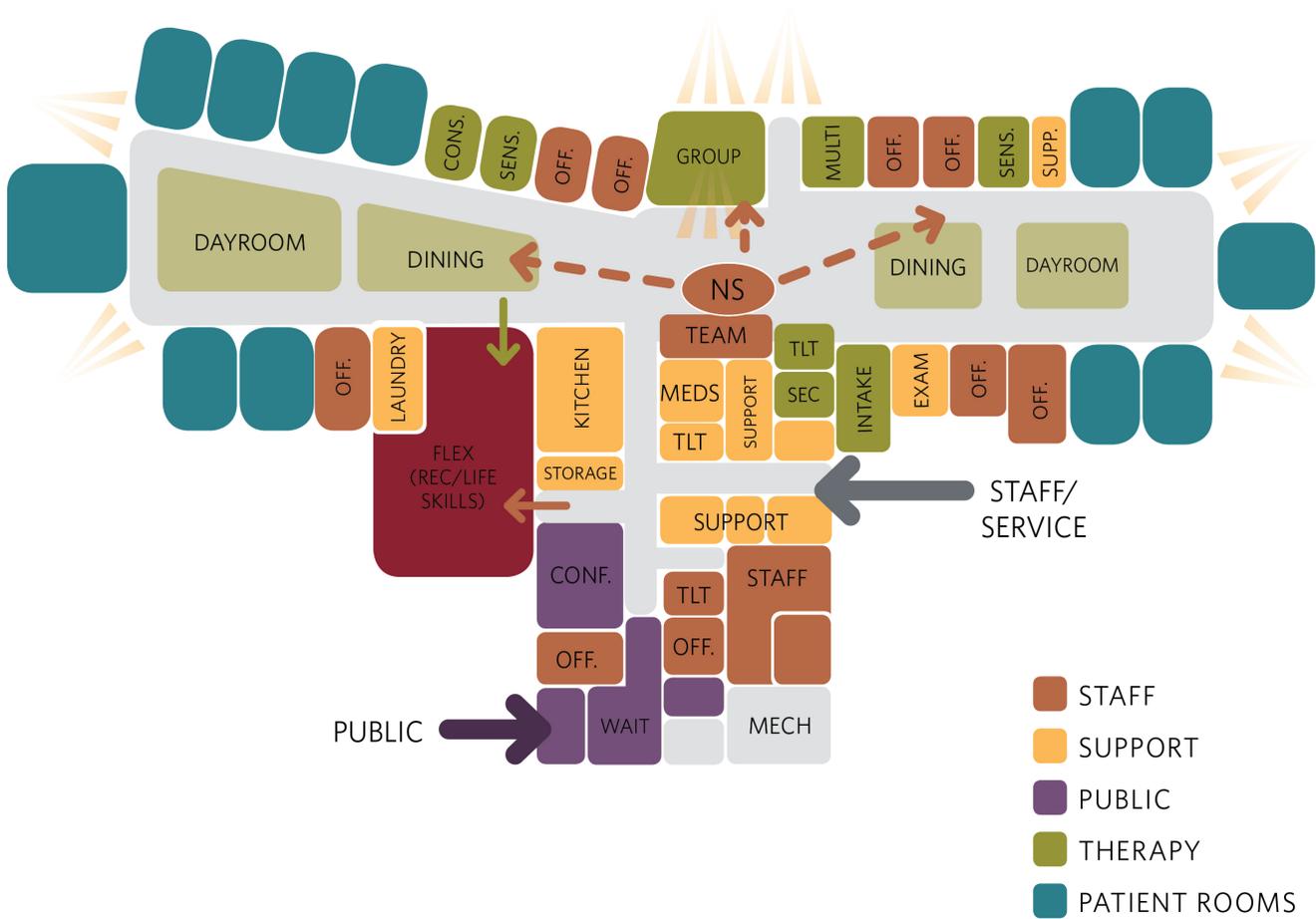
Additional costs on the current number of beds will be incurred due to housing a low acuity population in a hospital facility rather than a residential setting. For the population that does not have access to these or the existing civil beds, costs will be incurred in other settings around the state.

A2

Three, single-story facilities Alternative #2

Preferred Site Layout Overview:

The goal is to create a prototypical plan that would work well for each of the three treatment facilities: Evaluation and Treatment, 90-180, and Step-Down. Facilities will be highly flexible, allowing them to be easily adaptable to any other of these programs in the future. The proposed concept plan breaks the 16-bed facility down into two areas that allow staff to manage the patients' environment.

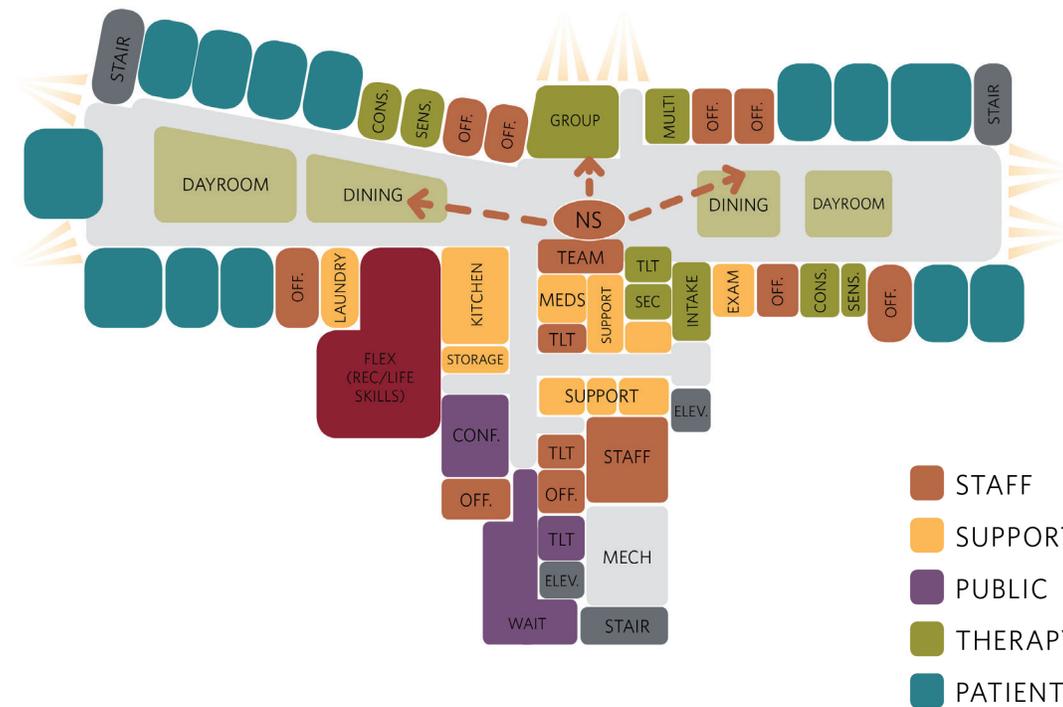
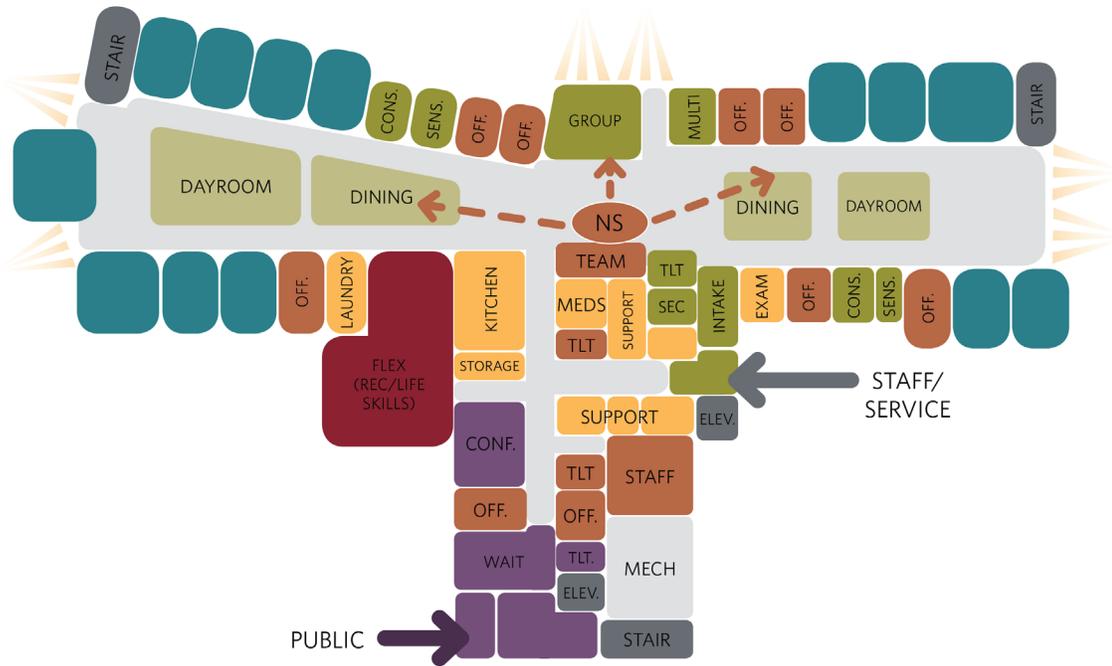


A3

One two-story facility, one single-story facility Alternative #3

Preferred Site Overview:

As some of the potential building sites have a smaller footprint, a two-story building option was also developed. Currently federal requirements limit reimbursements for facilities with more than 16 licensed beds (IMD). The 90-180 day and Step-down facilities are licensed differently so these facilities could potentially be stacked rather than be separate, one-story buildings..



- STAFF
- SUPPORT
- PUBLIC
- THERAPY
- PATIENT ROOMS



4

Detail Analysis

PROTOTYPE, 48-BED STATE-OWNED COMMUNITY CIVIL FACILITY

Design Innovation

Approaching Washington’s behavioral health programs with an innovative mindset is critical to the mission of transforming lives by supporting sustainable recovery, independence, and wellness. The new facilities explored in this pre-design effort will decentralize care and help patients recover in their communities at transitional, supportive campuses for healing. A hospitality sensibility rooted in calming, home-like spaces with ample daylighting, clear sightlines, and acoustical considerations will bring innovative environments tailored to the unique needs of the behavioral health population. These projects afford DSHS the opportunity to deliver care in a new way – in line with state-of-the-art care models that are delivering outcomes.



Pierce County’s Crisis Stabilization Center is approachable, intuitive, and welcoming for families and first responders



Telecare’s Milton location



Telecare’s Federal Way location matched the local neighborhood’s scale and character through residential-inspired exterior materials and roofline



In King County, Telecare’s great room features warm materials and abundant daylight



Positive messaging sets a supportive tone at Telecare King County

Research and applications have demonstrated that the care environment directly affects the health and healing of patients. Despite advances in the design of healthcare environments and our understanding of the relationship between mental and physical health, behavioral healthcare spaces lag behind that of other medical settings in terms of innovative design. Changing our approach to behavioral health design can improve outcomes for patients and satisfaction for staff while breaking some of the societal stigmas associated with mental illness.



The design for Skagit County’s nurse’s station balances hospitality with function. A low counter combined with glass partitions provides sheltered spaces for charting while promoting interactions.



The central gathering spaces at Pierce County's Crisis Stabilization Center creates comfortable zones while maintaining clear sight-lines from the nurse's station

Innovative spaces for healing encompass a holistic approach to the patient, the staff that supports them, and the environment itself. Improving the overall experience includes strategies such as:

- Locating the facility strategically in the community, close to family members. Blending the exterior into the surrounding environment also aids in destigmatizing the facilities themselves.
- Beginning with the arrival sequence and intake experience, the patient's first impressions inform them that this facility lands somewhere on the spectrum from therapeutic to punitive. Use of color, warm materials, appropriate artwork, natural daylight, and carefully selected artificial light play an important role in creating a healing environment.
- Cues for wayfinding and areas for personalization at the entry to each patient bedroom remove stressors and create a sense of belonging.
- Use of residential/hospitality design elements, including an emphasis on nature and natural materials and color palettes and a focus on recovery and hope in graphics.
- Physical activity is critically important. Space for large muscle activity must be made available. Access to the outdoors, as well as views from inside, should be considered.



Warm and comforting materials and colors provide a calming atmosphere that promotes healing



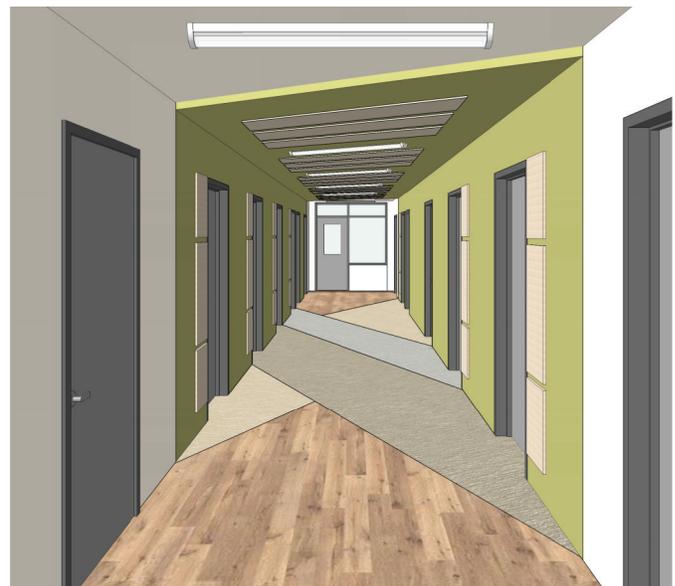
Patient bedrooms incorporate warm finishes, natural light views plus safe private bathrooms





Sensory rooms provide an opportunity to self-soothe and deescalate, and are a preferred alternate to seclusion spaces

- To help offset significant adjustments made by patients, environmental controls can be offered, such as variable lighting or music systems in patient rooms. Choice in furnishings and activity zones, recessed seating nooks to create a perceived sense of privacy or transition, and dimmable lighting in common areas also can re-introduce aspects of control into the patient experience.
- Features that allow self-regulation, such as sensory rooms, can help patients learn how to respond to the onset of emotions.
- It is important not to underestimate the need for quality spaces for staff respite. Behavioral patients feed off the tone that
- is set by staff. Safer, happier staff inherently promote a safer patient environment.



Skagit County's Crisis Stabilization Center highlights patient bedroom entries with color and pattern while also adding tackable wall panels for personalization

Not only do these considerations improve patient outcomes, they can impact recruitment and retention of critically important behavioral healthcare providers.



Durable, spa-like patient restroom finishes and fixtures at Telecare King County



The materials palette at Skagit County's Stabilization Center features warm, home-like, and natural materials, colors, and textures

Delivery Method

The state of Washington is studying different delivery methods for this project. The following is a summary of options.

Design-Bid-Build Method

This is the traditional delivery method for public works projects. The designers develop and estimate a project design and the project is bid to multiple contractors. This method usually achieves a lower first cost than other methods, but change orders are usually higher because the contractor has little time to familiarize themselves with the project. This creates a risk for the owner and tends to create opportunities for conflict over scope. There is also the risk that the low-bidder failed to account for a significant item, which can also put stress on the project. These challenges can be mitigated by high quality bidding documents.

General Contractor/Construction Manager (GC/CM) Alternative Method

The GC/CM method selects the contractor during schematic design, which allows the owner to have a direct contract with the design team and a direct contract with the contractor. The owner selects both the architect and contractor directly. The contractor is selected based on qualifications and overhead pricing. The contractor has an extended time period to plan construction and provide input into the design on constructibility issues. This method promotes risk mitigation with active budget management by the contractor during the design phase. The contractor can provide feedback to design as it is being developed. CPARB (Capital Projects Advisory Review Board) approval is required for this method.

Design/Build Alternative Method

This model creates a single contract for design and construction, as the design team is under contract to the contractor. Using the progressive design build model, the contractor/design team are selected together at the beginning of the project based on qualifications, overhead pricing, and experience. The Design/Builder responds to a Request for Qualifications and participates in proprietary meetings and interviews. This method inserts the contractor into the process from the beginning and gives the owner greater price certainty as the project develops. A MACC is set at design development and adhered to for the duration of the project. This method promotes teamwork between the owner, contractor and architect. CPARB (Capital Projects Advisory Review Board) approval is required for this method.

Recommendation

The GC/CM delivery method is recommended for this project. This process improves cost control, enables the contractor to provide design input as the design is developing, and mitigates construction risk for the owner. GC/CM will enable DSHS to implement the 48-bed project quicker than Design-Bid-Build and Design-Build by utilizing the current design team and performing the contractor selection during schematic design. This would save **3-4 months from a design bid build method and 4-6 months from a design /build schedule.**

Sustainability Approach - LEED Checklist

Summary of goals:

- Attain a minimum LEED v4 Silver (50-59 credit points).
- Comply with Executive order 18-01 State Efficiency and Environmental Performance

Summary of Executive Order:

- Site selection to reduce carbon impacts
- Use strategic technical consultants
- Durable envelope design, efficient HVAC system with submetering and graphic dashboards
- Target low-Embodied Carbon
- Design for renewables and energy storage

Pre-Design Process to Comply with Executive Order:

- Include one Zero Net Energy (ZNE) requirement in budget packages
 - On-site solar generation
- Identify one team ZNE champion
 - Sazan Group, Jack Newman
- Develop and refine Owners Project Requirements (OPR) to reflect ZNE
- Review contract structures and include ZNE
- Include ZNE goal in architect advertisement. Select Qualified team
 - Completed
- Set building energy performance target (EUI)
 - Pending
- Hold design Charrettes
 - Charette – Nov 11, 2019
- Conduct early design phase energy modeling

LEED v4 Executive Order 18-01 Alignment:

- Incorporate 'grid-optimized' building strategies with demand response capabilities
- Leverage energy resilience strategies for select, critical electrical loads
- Prioritize low energy use intensity (EUI) to minimize solar PV array capacity
 - Design solar PV array to maintain net energy metering, if feasible
 - Ensure solar Photo Voltaic (PV) array is optimized for project location

Implement solar PV and energy efficiency strategies to align with LEED v4 requirements:

- EAp2 - Minimum Energy Performance
- EAp3 - Building Level Energy Metering
- EAc2 - Optimize Energy Performance
- EAc3 - Advanced Energy Metering
- EAc4 - Demand Response
- EAc5 - Renewable Energy Production
- Regional Priority (RP) - Demand Response
 - One additional point is available for projects that incorporate building and equipment for participation in demand response programs through load shedding or shifting. On-site electricity generation does not meet the intent of this credit.
 - Credit requirements vary for projects located in a utility's service territory based on a Demand Response program's availability.
- Regional Priority - Renewable Energy Production
 - One additional point is available under EAc5. For a LEED v4 BD+C project, this additional point is achieved by implementing a renewable energy generation system, such as a solar PV array, that offsets 10% of the total building's annual energy cost.



Image from first Sustainability Design Meeting

Attendees at meeting:

- DSHS - Larry Covey, Aaron Martinez, Tim Byrne, Steve Hardy
BCRA - Laura Jacobson, Jim Wolch, Lorraine Jack, Justin Goroch
Lund Opsahl - Owen Bower
Sazan - Neils Fallisgaard, Jack Newman
BCE - Joe Snyder
AHBL - Bill Fierst

Sustainability Approach - LEED v4 Project Checklist

Resulting project table for intended point achievement:

LEED v4 for BD+C: New Construction and Major Renovation Project Checklist



Project Name: SW-BH Community 16/48 Bed Capacity
Date: Nov-19

Y	?	N	Credit	Integrative Process	1
5	10	1	Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
1	1		Credit	High Priority Site	2
2	3		Credit	Surrounding Density and Diverse Uses	5
			Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1
3 6 1 Sustainable Sites 10					
Y			Prereq	Construction Activity Pollution Prevention	Required
1	2		Credit	Site Assessment	1
	1		Credit	Site Development - Protect or Restore Habitat	2
1	1		Credit	Open Space	1
1	1	1	Credit	Rainwater Management	3
1	1		Credit	Heat Island Reduction	2
	1		Credit	Light Pollution Reduction	1
6 0 5 Water Efficiency 11					
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2	5		Credit	Outdoor Water Use Reduction	2
3	3		Credit	Indoor Water Use Reduction	6
	2		Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1
17 16 0 Energy and Atmosphere 33					
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4	2		Credit	Enhanced Commissioning	6
7	11		Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
1	1		Credit	Demand Response	2
3	3		Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2
7 6 0 Materials and Resources 13					
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
2	3		Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2
11 3 2 Indoor Environmental Quality 16					
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
	2		Credit	Enhanced Indoor Air Quality Strategies	2
3			Credit	Low-Emitting Materials	3
1	1		Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
1	2		Credit	Daylight	3
	1		Credit	Quality Views	1
			Credit	Acoustic Performance	1
4 2 0 Innovation 6					
3	2		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1
4 0 0 Regional Priority 4					
1			Credit	Regional Priority: Demand Response	1
1			Credit	Regional Priority: Renewable Energy Production	1
1			Credit	Regional Priority: Building Product Disclosure - Environmental Product Declar.	1
1			Credit	Regional Priority: Building Product Disclosure - Sourcing of Raw Mtls.	1
58	43	9	TOTALS	Possible Points: 110	
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110					

Sustainability Approach - Net-Zero Energy

General Conditions for Net Zero Energy

Achieving net zero energy performance for the Department of Social & Health Services’ (DSHS) new Behavioral Health Unit (BHU) facilities is feasible, based on the results of this pre-design study phase. Through an evaluation of estimated energy use, renewable energy system capacity and associated rough order of magnitude costs for the proposed 51,462 square foot 48-bed facilities, the following concept solar PV array design is provided. This 186 kW solar PV system option produces an estimated 201,800 kWh/year to provide a 100% offset of anticipated energy use.



Figure 1: 186 kW Solar PV Array Concept for Maple Lane Site

While six sites are considered for the new facilities, the ability to achieve net zero energy will largely be dictated by building orientation, available roof area or adjacent space for siting solar PV arrays, the targeted energy use intensity (EUI), and potential shading. For the 186 kW array conceptualized in Figure 1, a high-cost estimate of \$650,050 is anticipated using a unit cost of \$3.50/Watt. This system option features an azimuth of 132°; solar energy production is anticipated to increase, thereby reducing the required capacity if the building and associated rooftop array can be oriented South with a 180° azimuth.

Actual costs may be driven by the specified project location, solar PV system layout, capacity, and products specified. Important considerations include the benefits of producing on-site renewable energy for risk mitigation, and in the case of significant rises in utility costs, to providing significant operational cost savings throughout the PV array’s 25-year warranted lifetime.

Additionally, occupant engagement and educational benefits using an energy dashboard are feasible with the incorporation of on-site renewable energy, as well as potential resiliency outcomes when supplementing the system with energy storage or microgrid infrastructure. Alternative strategies for achieving net zero energy include the development of ground-mount solar PV arrays, or participation in off-site procurement strategies such as Power Purchase Agreements (PPAs) or utility purchasing programs including the ‘Green Direct’ program with Puget Sound Energy. Based on the results of this pre-design study, investments in energy efficiency and conservation measures are anticipated to reduce the investment in renewable energy required to achieve net zero, increasing the feasibility of this leading energy performance goal.

Site Specific Considerations for Alternatives

Each site identified in the pre-design study phase has been evaluated for solar potential and ranked for prioritization to achieve net zero energy:

Site	Solar	Notes
Fircrest	High	No southern shading, highest priority site for net zero energy
Maple Lane School	High	Partial shading to the South of proposed project location, although potential for adjacent solar PV and microgrid development with DOC
Western State Hospital	Medium	Limited or no shading at project site; prioritized for net zero energy
Echo Glen	Low	Shaded site not suitable for solar; requires tree removal to be coordinated with DNR
Snohomish County	TBD	To be determined
Clark County	TBD	To be determined

Figure 2: Site-Specific Assessment

Estimated C-100 Form

STATE OF WASHINGTON		
AGENCY / INSTITUTION PROJECT COST SUMMARY		
Agency	Department of Social and Health Services	
Project Name	Behavioral Health Community Civil 48 Bed Capacity	
OFM Project Number	CBS# 91000077	

Contact Information		
Name	BCRA/ ARC Cost	
Phone Number	253-627-4367	
Email	jwolch@bcradesign.com	

Statistics			
Gross Square Feet	52,983	MACC per Square Foot	\$424
Usable Square Feet	36,540	Escalated MACC per Square Foot	\$475
Space Efficiency	69.0%	A/E Fee Class	A
Construction Type	Mental Institutions	A/E Fee Percentage	8.23%
Remodel	No	Projected Life of Asset (Years)	50
Additional Project Details			
Alternative Public Works Project	Yes	Art Requirement Applies	Yes
Inflation Rate	3.12%	Higher Ed Institution	No
Sales Tax Rate %	8.40%	Location Used for Tax Rate	Vancouver
Contingency Rate	5%		
Base Month	June-18		
Project Administered By	Agency		

Schedule			
Predesign Start	September-19	Predesign End	October-18
Design Start	May-20	Design End	May-21
Construction Start	June-21	Construction End	December-22
Construction Duration	18 Months		

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Project Cost Estimate			
Total Project	\$45,930,709	Total Project Escalated	\$50,917,420
		Rounded Escalated Total	\$50,917,000

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Agency	Department of Social and Health Services	
Project Name	Behavioral Health Community Civil 48 Bed Capacity	
OFM Project Number	CBS# 91000077	

Cost Estimate Summary

Acquisition			
Acquisition Subtotal	\$3,000,000	Acquisition Subtotal Escalated	\$3,000,000

Consultant Services			
Predesign Services	\$195,826		
A/E Basic Design Services	\$1,339,580		
Extra Services	\$1,968,000		
Other Services	\$821,840		
Design Services Contingency	\$216,262		
Consultant Services Subtotal	\$4,541,508	Consultant Services Subtotal Escalated	\$4,935,267

Construction			
GC/CM Risk Contingency	\$3,901,122		
GC/CM or D/B Costs	\$4,270,245		
Construction Contingencies	\$1,123,312	Construction Contingencies Escalated	\$1,260,581
Maximum Allowable Construction Cost (MACC)	\$22,466,235	Maximum Allowable Construction Cost (MACC) Escalated	\$25,149,353
Sales Tax	\$2,667,917	Sales Tax Escalated	\$2,988,707
Construction Subtotal	\$34,428,830	Construction Subtotal Escalated	\$38,568,550

Equipment			
Equipment	\$1,100,000		
Sales Tax	\$92,400		
Non-Taxable Items	\$0		
Equipment Subtotal	\$1,192,400	Equipment Subtotal Escalated	\$1,338,112

Artwork			
Artwork Subtotal	\$125,747	Artwork Subtotal Escalated	\$125,747

Agency Project Administration			
Agency Project Administration Subtotal	\$1,342,224		
DES Additional Services Subtotal	\$0		
Other Project Admin Costs	\$50,000		
Project Administration Subtotal	\$2,042,224	Project Administration Subtotal Escalated	\$2,291,784

Other Costs			
Other Costs Subtotal	\$600,000	Other Costs Subtotal Escalated	\$657,960

Project Cost Estimate			
Total Project	\$45,930,709	Total Project Escalated	\$50,917,420
		Rounded Escalated Total	\$50,917,000

Cost Estimate Details

Acquisition Costs				
Item	Base Amount	Escalation Factor	Escalated Cost	Notes
Purchase/Lease	\$3,000,000			
Appraisal and Closing				
Right of Way	\$0			
Demolition				
Pre-Site Development				
Other				
Insert Row Here				
ACQUISITION TOTAL	\$3,000,000	NA	\$3,000,000	

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Cost Estimate Details

Consultant Services				
Item	Base Amount	Escalation Factor	Escalated Cost	Notes
1) Pre-Schematic Design Services				
Programming/Site Analysis				
Environmental Analysis				
Predesign Study	\$195,826			
Other				
Insert Row Here				
Sub TOTAL	\$195,826	1.0607	\$207,713	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	\$1,339,580			69% of A/E Basic Services
Other				
Insert Row Here				
Sub TOTAL	\$1,339,580	1.0771	\$1,442,862	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	\$120,000			
Geotechnical Investigation	\$55,000			
Commissioning	\$50,000			
Site Survey	\$75,000			
Testing	\$150,000			
LEED Services	\$120,000			
Voice/Data Consultant	\$35,000			
Value Engineering	\$80,000			
Constructability Review	\$85,000			
Environmental Mitigation (EIS)	\$55,000			
Landscape Consultant	\$65,000			
ELCCA	\$50,000			
LCCT	\$75,000			
Reimburseables incl	\$50,000			
Reprographics prior to bid				
Advertising	\$3,000			
Traffic analysis	\$20,000			
Envelope Consultant	\$65,000			
Interior Design	\$90,000			
Acoustic Design	\$50,000			
Security Consultant	\$20,000			
Audio Visual Consultant	\$25,000			
Cost and Scheduling	\$50,000			
Value Engineering Participation	\$65,000			
Constructability Review Participation	\$60,000			
Environmental Graphics/Signage	\$40,000			
Lighting Consultant	\$50,000			
Healthcare Services Consultant	\$100,000			
Door Hardware Consultant	\$15,000			
CUP/SEPA/LandUse	\$100,000			
Net Zero Energy Consultant	\$150,000			
Insert Row Here				
Sub TOTAL	\$1,968,000	1.0771	\$2,119,733	Escalated to Mid-Design

4) Other Services						
Bid/Construction/Closeout	\$601,840					31% of A/E Basic Services
HVAC Balancing						
Staffing						
Commissioning and Training	\$100,000					
Reimburseables/Reprographics for bid and construction	\$45,000					
Construction Materials Testing	\$75,000					
Insert Row Here						
Sub TOTAL	\$821,840	1.1222	\$922,269			Escalated to Mid-Const.
5) Design Services Contingency						
Design Services Contingency	\$216,262					
Other						
Insert Row Here						
Sub TOTAL	\$216,262	1.1222	\$242,690			Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	\$4,541,508		\$4,935,267			

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Cost Estimate Details

Construction Contracts				
Item	Base Amount	Escalation Factor	Escalated Cost	Notes
1) Site Work				
G10 - Site Preparation	\$370,972			
G20 - Site Improvements	\$700,933			
G30 - Site Mechanical Utilities	\$220,000			
G40 - Site Electrical Utilities	\$440,000			
G60 - Other Site Construction				
Frontage improvements	\$300,000			
Insert Row Here				
Sub TOTAL	\$2,031,905	1.0966	\$2,228,188	
2) Related Project Costs				
Offsite Improvements				
City Utilities Relocation	\$300,000			
Parking Mitigation				
Stormwater Retention/Detention	\$100,000			
Other				
Insert Row Here				
Sub TOTAL	\$400,000	1.0966	\$438,640	
3) Facility Construction				
A10 - Foundations	\$939,567			
A20 - Basement Construction	\$0			
B10 - Superstructure	\$1,570,125			
B20 - Exterior Closure	\$2,668,554			
B30 - Roofing	\$1,811,772			
C10 - Interior Construction	\$2,143,422			
C20 - Stairs	\$0			
C30 - Interior Finishes	\$1,565,784			
D10 - Conveying	\$0			
D20 - Plumbing Systems	\$1,019,922			
D30 - HVAC Systems	\$2,907,456			
D40 - Fire Protection Systems	\$317,898			
D50 - Electrical Systems	\$3,708,810			
F10 - Special Construction	\$0			
F20 - Selective Demolition	\$100,000			
General Conditions	\$0			
Building Related Site Improvements	\$82,938			Net Zero Building modifications
PV Panels	\$650,000			
E10 Fixed Equipment / E20 Fixed Furnishings	\$548,082			
Sub TOTAL	\$20,034,330	1.1222	\$22,482,525	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	\$22,466,235		\$25,149,353	

5) GCCM Risk Contingency				
GCCM Risk Contingency	\$3,901,122			
Other				
Insert Row Here				
Sub TOTAL	\$3,901,122	1.1222	\$4,377,840	
6) GCCM or Design Build Costs				
GCCM Fee	\$1,520,245			
Bid General Conditions	\$1,250,000			
GCCM Preconstruction Services	\$250,000			
NSS	\$1,250,000			
Insert Row Here				
Sub TOTAL	\$4,270,245	1.1222	\$4,792,069	
7) Construction Contingency				
Allowance for Change Orders	\$1,123,312			
Other				
Insert Row Here				
Sub TOTAL	\$1,123,312	1.1222	\$1,260,581	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	\$0	1.1222	\$0	
Sales Tax				
Sub TOTAL	\$2,667,917		\$2,988,707	
CONSTRUCTION CONTRACTS TOTAL	\$34,428,830		\$38,568,550	

Green cells must be filled in by user

Cost Estimate Details

Equipment					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
E10 - Equipment	\$450,000				
E20 - Furnishings	\$450,000				
F10 - Special Construction					
IT Equip/computers/printers	\$200,000				
Insert Row Here					
Sub TOTAL	\$1,100,000		1.1222	\$1,234,420	
1) Non Taxable Items					
Other					
Insert Row Here					
Sub TOTAL	\$0		1.1222	\$0	
Sales Tax					
Sub TOTAL	\$92,400			\$103,692	
EQUIPMENT TOTAL					
	\$1,192,400			\$1,338,112	

Green cells must be filled in by user

Cost Estimate Details

Artwork					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Project Artwork	\$125,747				0.5% of Escalated MACC for new construction
Higher Ed Artwork	\$0				0.5% of Escalated MACC for new and renewal construction
Other					
Insert Row Here					
ARTWORK TOTAL	\$125,747		NA	\$125,747	

Green cells must be filled in by user

Cost Estimate Details

Project Management				
Item	Base Amount	Escalation Factor	Escalated Cost	Notes
Agency Project Management	\$1,342,224			
Additional Services				
Additional Management/Aministration	\$650,000			On-site DSHS construction manager added
Construction Trailor for DSHS Construction CM	\$50,000			Trailer for on-site DSHS CM
PROJECT MANAGEMENT TOTAL	\$2,042,224	1.1222	\$2,291,784	

Green cells must be filled in by user

Cost Estimate Details

Other Costs				
Item	Base Amount	Escalation Factor	Escalated Cost	Notes
Mitigation Costs				
Hazardous Material Remediation/Removal	\$100,000			
Historic and Archeological Mitigation				
Permit and Plan Review Fees	\$500,000			
Insert Row Here				
OTHER COSTS TOTAL	\$600,000	1.0966	\$657,960	

Green cells must be filled in by user

C-100(2018)
Additional Notes

Tab A. Acquisition

Insert Row Here

Tab B. Consultant Services

Insert Row Here

Tab C. Construction Contracts

Insert Row Here

Tab D. Equipment

Covers owner provided/purchased furnishings and equipment

Insert Row Here

Tab E. Artwork

Insert Row Here

Tab F. Project Management

Insert Row Here

Tab G. Other Costs

Insert Row Here



6

Appendices

- A. Pre-Design Checklist
- B. Life Cycle Cost Model
- C. Visioning Questionnaire Responses
- D. Meeting Notes
- E. Mechanical Narrative
- F. Net-Zero Pre-Design Study
- G. Report to the Legislature: Predicting Referrals for Competency, 12.1.18
- H. Letter from Department of Archeology and Historic Preservation
- I. Energy Life Cycle Cost Analysis



Appendix 1: Predesign checklist and outline

A predesign should include the content detailed here. OFM will approve limited scope predesigns on a case-by-case basis.

❖ Executive summary

❖ Problem statement, opportunity or program requirement

- Identify the problem, opportunity or program requirement that the project addresses and how it will be accomplished.
- Identify and explain the statutory or other requirements that drive the project's operational programs and how these affect the need for space, location or physical accommodations. Include anticipated caseload projections (growth or decline) and assumptions, if applicable.
- Explain the connection between the agency's mission, goals and objectives; statutory requirements; and the problem, opportunity or program requirements.
- Describe in general terms what is needed to solve the problem.
- Include any relevant history of the project, including previous predesigns or budget funding requests that did not go forward to design or construction.

❖ Analysis of alternatives (including the preferred alternative)

- Describe all alternatives that were considered, including the preferred alternative. Include:
 - A no action alternative.
 - Advantages and disadvantages of each alternative. Please include a high-level summary table with your analysis that compares the alternatives, including the anticipated cost for each alternative.
 - Cost estimates for each alternative:
 - Provide enough information so decision makers have a general understanding of the costs.
 - Complete OFM's Life Cycle Cost [Model](#) (RCW [39.35B.050](#)).
 - Schedule estimates for each alternative. Estimate the start, midpoint and completion dates.

❖ Detailed analysis of preferred alternative

- Nature of space – how much of the proposed space will be used for what purpose (i.e., office, lab, conference, classroom, etc.)
- Occupancy numbers.
- Basic configuration of the building, including square footage and the number of floors.
- Space needs assessment. Identify the guidelines used.
- Site analysis:
 - Identify site studies that are completed or under way.
 - Location.

- Building footprint and its relationship to adjacent facilities and site features. Provide aerial view, sketches of the building site and basic floorplans.
- Stormwater requirements.
- Ownership of the site and any acquisition issues.
- Easements and setback requirements.
- Potential issues with the surrounding neighborhood, during construction and ongoing.
- Utility extension or relocation issues.
- Potential environmental impacts.
- Parking and access issues, including improvements required by local ordinances, local road impacts and parking demand.
- Impact on surroundings and existing development with construction lay-down areas and construction phasing.
- Consistency with applicable long-term plans (such as the Thurston County and Capitol campus master plans and agency or area master plans) as required by RCW [43.88.110](#).
- Consistency with other laws and regulations:
 - High-performance public buildings (Chapter [39.35D](#) RCW).
 - State efficiency and environmental performance, if applicable (Executive Order [18-01](#)).
 - Greenhouse gas emissions reduction policy (RCW [70.235.070](#)).
 - Archeological and cultural resources (Executive Order [05-05](#) and [Section 106](#) of the National Historic Preservation Act of 1966).
 - Americans with Disabilities Act (ADA) implementation (Executive Order [96-04](#)).
 - Compliance with planning under Chapter [36.70A](#) RCW, as required by RCW [43.88.0301](#).
 - Information required by RCW [43.88.0301](#)(1).
 - Other codes or regulations.
- Identify problems that require further study. Evaluate identified problems to establish probable costs and risk.
- Identify significant or distinguishable components, including major equipment and ADA requirements in excess of existing code.
- Identify planned technology infrastructure and other related IT investments that affect the building plans.
- Describe planned commissioning to ensure systems function as designed.
- Describe any future phases or other facilities that will affect this project.
- Identify and justify the proposed project delivery method. For GC/CM, link to the requirements in RCW [39.10.340](#).
- Describe how the project will be managed within the agency.
- Schedule.
 - Provide a high-level milestone schedule for the project, including key dates for budget approval, design, bid, acquisition, construction, equipment installation, testing, occupancy and full operation.
 - Incorporate value-engineering analysis and constructability review into the project schedule, as required by RCW [43.88.110](#)(5)(c).



Life Cycle Cost Models

Ownership Option 1 Information Sheet

* **Requires a user input** **Green Cell** = Value can be entered by user. **Yellow Cell** = Calculated value.

*	Project Description	52,983 SF 48 bed 90/180 facility located in Vancouver, Washington on purchased property. The facility will be constructed as three separate 17,661 SF buildings.
---	----------------------------	--

*	Construction or Purchase/Remodel	Construction
---	---	--------------

*	Project Location	Vancouver	Market Area = Clark County
---	-------------------------	-----------	----------------------------

*	Statistics	
*	Gross Sq Ft	52,983
*	Usable Sq Ft	31,800
	Space Efficiency	60%
	Estimated Acres Needed	3.00
	MACC Cost per Sq Ft	\$424.03
	Estimated Total Project Costs per Sq Ft	\$793.85
	Escalated MACC Cost per Sq Ft	\$464.97
	Escalated Total Project Costs per Sq Ft	\$870.49

*	Move In Date	2/1/2023
---	---------------------	----------

Interim Lease Information	Start Date
Lease Start Date	
Length of Lease (in months)	
Square Feet (holdover/temp lease)	
Lease Rate- Full Serviced (\$/SF/Year)	
One Time Costs (if double move)	

Construction Cost Estimates (See Capital Budget System For Detail)				
	Known Costs	Estimated Costs	Cost to Use	
	Acquisition Costs Total	\$ -	\$ 750,000	
A & E	Consultant Services			
	A & E Fee Percentage (if services not specified)	6.51%	6.91% Std	
	Pre-Schematic Design services	\$ 195,826		
	Construction Documents	\$ 1,339,580		
	Extra Services	\$ 1,007,500		
	Other Services	\$ 1,968,000		
	Design Services Contingency	\$ 216,262		
	Consultant Services Total	\$ 4,727,168	\$ 1,519,119	\$ 4,727,168
MACC	Construction Contracts			
	Site Work	\$ 2,031,905		
	Related Project Costs	\$ 400,000		
	Facility Construction	\$ 20,034,330		
	MACC SubTotal	\$ 22,466,235	\$ 24,372,180	\$ 22,466,235
	Construction Contingency (5% default)	\$ 1,123,312	\$ 1,123,312	\$ 1,123,312
	Non Taxable Items			\$ -
	Sales Tax			
	Construction Additional Items Total	\$ 1,123,312	\$ 1,123,312	\$ 1,123,312
	Equipment			
Equipment				
Non Taxable Items				
Sales Tax	\$ 2,667,917			
Equipment Total	\$ 2,667,917		\$ 2,667,917	
Art Work Total		\$ 112,331	\$ 112,331	
Other Costs				
GC CM Risk Contingency	\$ 3,901,000			
GC CM Cost	\$ 4,270,245			
Other Costs Total	\$ 8,171,245		\$ 8,171,245	
Project Management Total	\$ 2,042,224		\$ 2,042,224	
Grand Total Project Cost	\$ 41,198,101	\$ 27,876,942	\$ 42,060,432	

Construction One Time Project Costs		
One Time Costs	Estimate	Calculated
Moving Vendor and Supplies		\$ -
Other (not covered in construction)		
Total	\$ -	\$ -

\$205 / Person in FY09

Ongoing Building Costs					
Added Services	New Building Operating Costs	Known Cost /GSF/ 2023	Estimated Cost /GSF/ 2023	Total Cost / Year	Cost / Month
<input checked="" type="checkbox"/>	Energy (Electricity, Natural Gas)	\$ -	\$ 1.31	\$ 69,442	\$ 5,787
<input checked="" type="checkbox"/>	Janitorial Services	\$ -	\$ 1.61	\$ 85,369	\$ 7,114
<input checked="" type="checkbox"/>	Utilities (Water, Sewer, & Garbage)	\$ -	\$ 1.23	\$ 64,982	\$ 5,415
<input checked="" type="checkbox"/>	Grounds	\$ -	\$ 0.07	\$ 3,822	\$ 319
<input checked="" type="checkbox"/>	Pest Control	\$ -	\$ 0.12	\$ 6,371	\$ 531
<input checked="" type="checkbox"/>	Security	\$ -	\$ 0.10	\$ 5,097	\$ 425
<input checked="" type="checkbox"/>	Maintenance and Repair	\$ -	\$ 6.49	\$ 344,023	\$ 28,669
<input checked="" type="checkbox"/>	Management	\$ -	\$ 0.60	\$ 31,854	\$ 2,654
<input checked="" type="checkbox"/>	Road Clearance	\$ -	\$ 0.07	\$ 3,822	\$ 319
<input checked="" type="checkbox"/>	Telecom	\$ 0.35	\$ -	\$ 18,544	\$ 1,545
	Additional Parking	\$ -	\$ -	\$ -	\$ -
	Other	\$ -	\$ -	\$ -	\$ -
	Total Operating Costs	\$ 0.35	\$ 11.60	\$ 633,326	\$ 52,777

Ownership Option 2 Information Sheet

* **Requires a user input** **Green Cell** = Value can be entered by user. **Yellow Cell** = Calculated value.

*	Project Description	Construction of a new 55,661 48 Bed 90/180 Facility on Purchased property in Vancouver, Wa. The project includes a two story 38,000 SF building and a one story 17,661 building.
---	----------------------------	--

*	Construction or Purchase/Remodel	Construction
---	---	--------------

*	Project Location	Vancouver	Market Area = Clark County
---	-------------------------	-----------	----------------------------

Statistics		
*	Gross Sq Ft	55,661
*	Usable Sq Ft	33,400
	Space Efficiency	60%
	Estimated Acres Needed	3.00
	MACC Cost per Sq Ft	\$460.00
	Estimated Total Project Costs per Sq Ft	\$593.62
	Escalated MACC Cost per Sq Ft	\$504.41
	Escalated Total Project Costs per Sq Ft	\$650.94

*	Move In Date	2/1/2023
---	---------------------	----------

Interim Lease Information	Start Date
Lease Start Date	
Length of Lease (in months)	
Square Feet (holdover/temp lease)	
Lease Rate- Full Serviced (\$/SF/Year)	
One Time Costs (if double move)	

Construction Cost Estimates (See Capital Budget System For Detail)				
	Known Costs	Estimated Costs	Cost to Use	
	\$ 1,000,000	\$ 750,000	\$ 1,000,000	
A & E	Consultant Services			
	A & E Fee Percentage (if services not specified)	6.51%	6.76% Std	6.51%
	Pre-Schematic Design services	\$ 195,826		
	Construction Documents	\$ 1,339,580		
	Extra Services	\$ 1,968,000		
	Other Services	\$ 821,840		
	Design Services Contingency	\$ 216,262		
	Consultant Services Total	\$ 4,541,508	\$ 1,731,293	\$ 4,541,508
MACC	Construction Contracts			
	Site Work			
	Related Project Costs			
	Facility Construction			
	MACC SubTotal	\$ -	\$ 25,604,060	\$ 25,604,060
	Construction Contingency (5% default)		\$ 1,280,203	\$ 1,280,203
	Non Taxable Items			\$ -
	Sales Tax			
	Construction Additional Items Total	\$ -	\$ 1,280,203	\$ 1,280,203
	Equipment			
Equipment	\$ 450,000			
Non Taxable Items				
Sales Tax	\$ 37,800			
Equipment Total	\$ 487,800		\$ 487,800	
Art Work Total		\$ 128,020	\$ 128,020	
Other Costs				
Other Costs Total	\$ -		\$ -	
Project Management Total			\$ -	
Grand Total Project Cost		\$ 29,493,576	\$ 33,041,591	

Construction One Time Project Costs		
One Time Costs	Estimate	Calculated
Moving Vendor and Supplies	\$ 76,800	\$ -
Other (not covered in construction)		
Total	\$ 76,800	\$ 76,800

\$205 / Person in FY09

Ongoing Building Costs					
Added Services	New Building Operating Costs	Known Cost /GSF/ 2023	Estimated Cost /GSF/ 2023	Total Cost / Year	Cost / Month
<input checked="" type="checkbox"/>	Energy (Electricity, Natural Gas)	\$ -	\$ 1.31	\$ 72,952	\$ 6,079
<input checked="" type="checkbox"/>	Janitorial Services	\$ -	\$ 1.61	\$ 89,684	\$ 7,474
<input checked="" type="checkbox"/>	Utilities (Water, Sewer, & Garbage)	\$ -	\$ 1.23	\$ 68,267	\$ 5,689
<input checked="" type="checkbox"/>	Grounds	\$ -	\$ 0.07	\$ 4,016	\$ 335
<input checked="" type="checkbox"/>	Pest Control	\$ -	\$ 0.12	\$ 6,693	\$ 558
<input checked="" type="checkbox"/>	Security	\$ -	\$ 0.10	\$ 5,354	\$ 446
<input checked="" type="checkbox"/>	Maintenance and Repair	\$ -	\$ 6.49	\$ 361,412	\$ 30,118
<input checked="" type="checkbox"/>	Management	\$ -	\$ 0.60	\$ 33,464	\$ 2,789
<input checked="" type="checkbox"/>	Road Clearance	\$ -	\$ 0.07	\$ 4,016	\$ 335
<input checked="" type="checkbox"/>	Telecom	\$ 0.35	\$ -	\$ 19,481	\$ 1,623
	Additional Parking	\$ -	\$ -	\$ -	\$ -
	Other	\$ -	\$ -	\$ -	\$ -
	Total Operating Costs	\$ 0.35	\$ 11.60	\$ 665,337	\$ 55,445

Life Cycle Cost Analysis - Project Summary

Agency	DSHS Capital Programs
Project Title	16 Bed Community Civil Facility

Existing Description	N/A
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Lease Option 1 Description	N/A
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Lease Option 2 Description	N/A
-----------------------------------	-----

Ownership Option 1 Description	52,983 SF 48 bed 90/180 facility located in Vancouver, Washington on purchased property. The facility will be constructed as three separate 17,661 SF buildings.
---------------------------------------	--

Ownership Option 2 Description	Construction of a new 55,661 48 Bed 90/180 Facility on Purchased property in Vancouver, Wa. The project includes a two story 38,000 SF building and a one story 17,661 building.
---------------------------------------	--

Ownership Option 3 Description	
---------------------------------------	--

Lease Options Information	Existing Lease	Lease Option 1	Lease Option 2
Total Rentable Square Feet	-	-	-
Annual Lease Cost (Initial Term of Lease)	\$ -	\$ -	\$ -
Full Service Cost/SF (Initial Term of Lease)	\$ -	\$ -	\$ -
Occupancy Date	n/a		
Project Initial Costs	n/a	\$ -	\$ -
Persons Relocating	-	-	-
RSF/Person Calculated			

Ownership Information	Ownership 1	Ownership 2	Ownership 3
Total Gross Square Feet	52,983	55,661	-
Total Rentable Square Feet	31,800	33,400	-
Occupancy Date	2/1/2023	2/1/2023	
Initial Project Costs	\$ -	\$ 76,800	\$ -
Est Construction TPC (\$/GSF)	\$ 870	\$ 651	\$ -
RSF/Person Calculated	-	-	-

Financial Analysis of Options

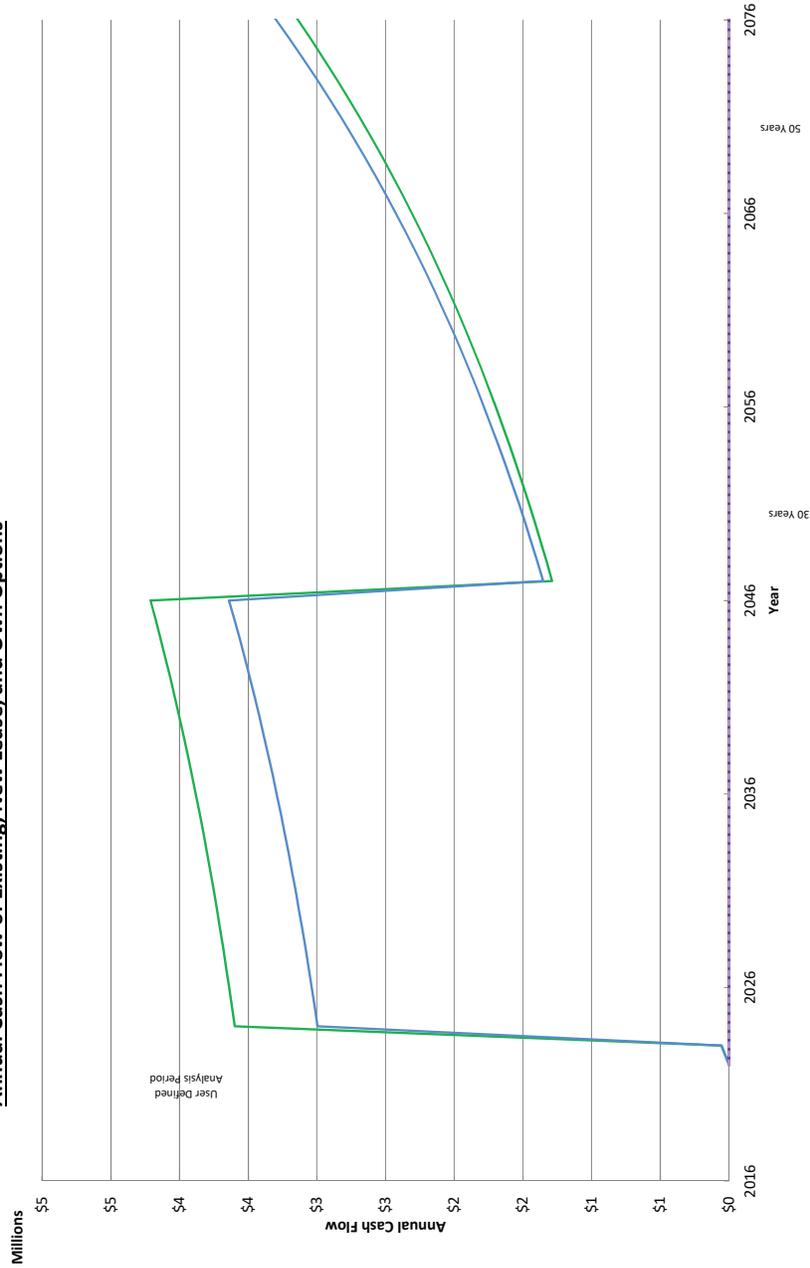
Years	Display Option?	Yes		Lease 1		Lease 2		No		Ownership 1		Ownership 2		Ownership 3		
		Existing Lease Current	Lease 1 Current	Lease 2 Current	GO Bond	COP	COP Deferred *	63-20	GO Bond	COP	COP Deferred	63-20	GO Bond	COP	COP Deferred	63-20
0		\$ -	\$ -	\$ -			\$ -				\$ -					
	0 Year Cumulative Cash	\$ -	\$ -	\$ -			\$ -				\$ -					
	0 Year Net Present Value	\$ -	\$ -	\$ -			\$ -				\$ -					
	Lowest Cost Option (Analysis Period)															

Years	Display Option?	Yes		Lease 1		Lease 2		No		Ownership 1		Ownership 2		Ownership 3		
		Existing Lease Current	Lease 1 Current	Lease 2 Current	GO Bond	COP	COP Deferred *	63-20	GO Bond	COP	COP Deferred	63-20	GO Bond	COP	COP Deferred	63-20
30		\$ -	\$ -	\$ -			\$ -				\$ -					
	30 Year Cumulative Cash	\$ -	\$ -	\$ -			\$ -				\$ -					
	30 Year Net Present Value	\$ -	\$ -	\$ -			\$ -				\$ -					
	Lowest Cost Option (30 Years)															

Years	Display Option?	Yes		Lease 1		Lease 2		No		Ownership 1		Ownership 2		Ownership 3		
		Existing Lease Current	Lease 1 Current	Lease 2 Current	GO Bond	COP	COP Deferred *	63-20	GO Bond	COP	COP Deferred	63-20	GO Bond	COP	COP Deferred	63-20
50		\$ -	\$ -	\$ -			\$ -				\$ -					
	50 Year Cumulative Cash	\$ -	\$ -	\$ -			\$ -				\$ -					
	50 Year Net Present Value	\$ -	\$ -	\$ -			\$ -				\$ -					
	Lowest Cost Option (50 Years)															

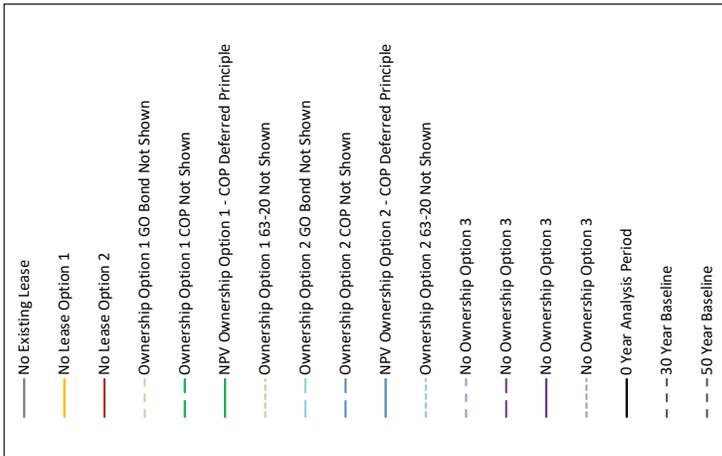
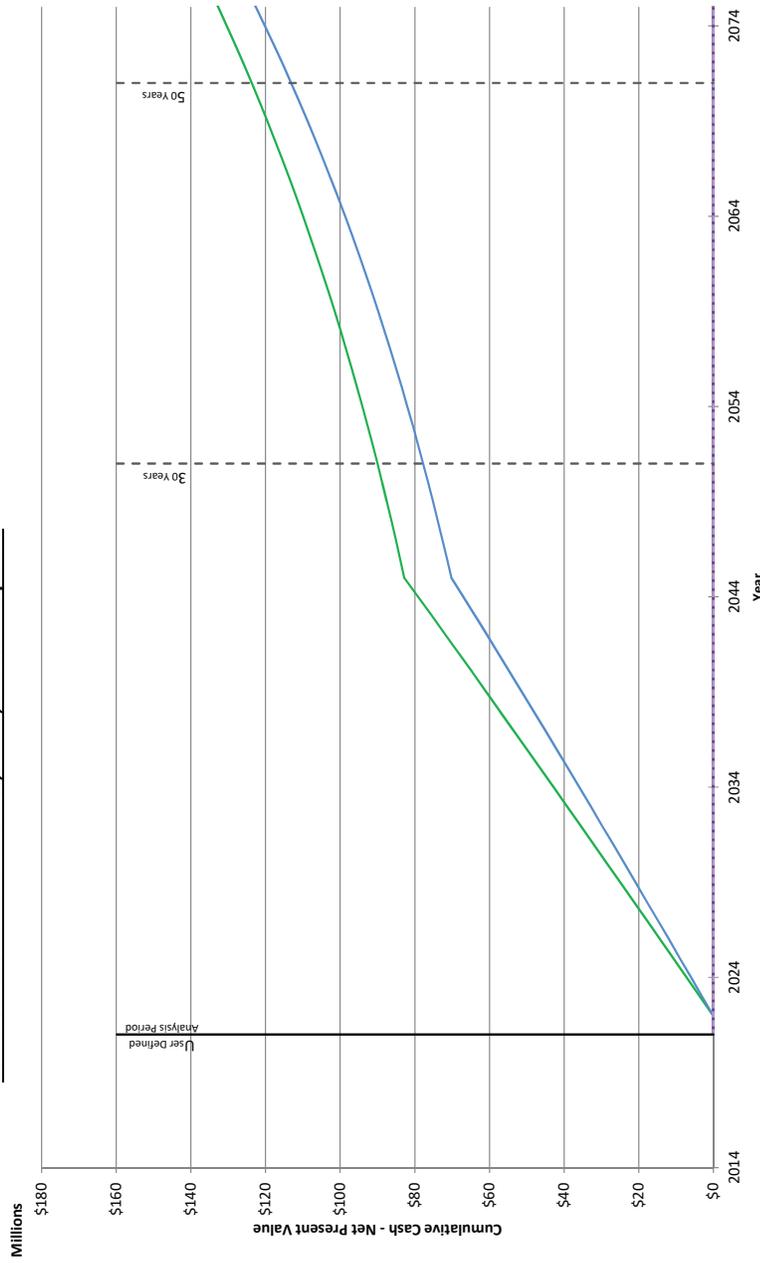
* - Defers payment on principle for 2 years while the building is being constructed. See instructions on Capitalized Interest.

Annual Cash Flow of Existing, New Lease, and Own Options



- No Existing Lease
- No Lease Option 1
- No Lease Option 2
- Ownership Option 1 GO Bond Not Shown
- Ownership Option 1 COP Not Shown
- Ownership Option 1 - COP Deferred Annual Cash
- Ownership Option 1 63-20 Not Shown
- Ownership Option 2 GO Bond Not Shown
- Ownership Option 2 COP Not Shown
- Ownership Option 2 - COP Deferred Annual Cash
- Ownership Option 2 63-20 Not Shown
- No Ownership Option 3
- 0 Year Analysis Period
- 30 Year Baseline
- 50 Year Baseline

Cumulative Cash - NPV of Exist, Lease, and Own Options



Financial Assumptions

Date of Life Cycle Cost Analysis:	2/26/2020
Analysis Period Start Date	2/1/2021
User Input Years of Analysis	0

All assumptions subject to change to reflect updated costs and conditions.

	Lease Options			Ownership Option 1			Ownership Option 2			Ownership Option 3		
	Existing Lease	Lease Option 1	Lease Option 2	GO Bond	COP	63-20	GO Bond	COP	63-20	GO Bond	COP	63-20
Inflation / Interest Rate	3.120%	3.120%	3.120%	3.540%	3.670%	3.670%	3.540%	3.670%	3.670%	3.540%	3.720%	3.720%
Discount Rate	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%
Length of Financing	N/A	N/A	N/A	25	25	25	25	25	25	25	25	25

See Financial Assumptions tab for more detailed information
COP, Deferred and 63-20 Financing defer the payment on principle until construction completion.

New Lease Assumptions

Real Estate Transaction fees are 2.5% of the lease for the first 5 years and 1.25% for each year thereafter in the initial term of the lease.
Tenant Improvements are typically estimated at \$115 per rentable square foot.
IT Infrastructure is typically estimated at \$350 per person.
Furniture costs are typically estimated at \$500 per person and do not include new workstations.
Moving Vendor and Supplies are typically estimated at \$205 per person.

Default Ownership Options Assumptions

Assumes a 2 month lease to move-in overlap period for outfitting building and relocation.
Assumes surface parking.
The floor plate of the construction option office building is 25,000 gross square feet.
The estimated total project cost for construction is \$644.00 per square foot.
See the Capital Construction Defaults tab for more construction assumptions.

- Describe factors that may delay the project schedule.
- Describe the permitting or local government ordinances or neighborhood issues (such as location or parking compatibility) that could affect the schedule.
- Identify when the local jurisdiction will be contacted and whether community stakeholder meetings are a part of the process.

❖ **Project budget analysis for the preferred alternative**

- Cost estimate.
 - Major assumptions used in preparing the cost estimate.
 - Summary table of Uniformat Level II cost estimates.
 - The [C-100](#).
- Proposed funding.
 - Identify the fund sources and expected receipt of the funds.
 - If alternatively financed, such as through a COP, provide the projected debt service and fund source. Include the assumptions used for calculating finance terms and interest rates.
- Facility operations and maintenance requirements.
 - Define the anticipated impact of the proposed project on the operating budget for the agency or institution. Include maintenance and operating assumptions (including FTEs).
 - Show five biennia of capital and operating costs from the time of occupancy, including an estimate of building repair, replacement and maintenance.
- Clarify whether furniture, fixtures and equipment are included in the project budget. If not included, explain why.

❖ **Pre-design appendices**

- Completed Life Cycle Cost [Model](#).
- A letter from DAHP.



We are looking for some feedback on assessing the programmatic and functional needs of a new 16/48 bed facilities for DSHS. The following information will help inform our discussions that will be had on October 21st. To prepare for this meeting please fill out the following questionnaire.

Note: Please return the questionnaire to Larry Covey by October 14th.

1. Name: Bryan Zolnikov	Title: Office of Forensic Mental Health Services Quality Manager
---------------------------------------	--

2. **Briefly describe the unique patient population needs and length of stay for the following programs:**

<p>E&T: My impression is very short-term stays (averaging 3-14 days) relative to other patient populations. Many patients will have acute psychiatric issues such as active psychosis and suicidal ideation and intent. The facility will need to be anti-ligature from top to bottom, have clear view of patient living areas (minimal to no "blind spots"), and be friendly to the staff when they are monitoring patients (e.g., line of sight, 1:1). Concur with Dr. Waiblinger regarding the need for a facility that supports recreational and vocational rehabilitation services. Discharge planning is done under a very short time frame.</p>
<p>90-180 day: Concur with Dr. Waiblinger regarding enhanced vocational training. The facility would need to be oriented toward supporting rehabilitation/teaching independent living skills.</p>
<p>Step Down: Concur with Dr. Waiblinger regarding skills-based training. I envision a facility that supports independent living skills (e.g., may have washer and drier for patients to use) and mirrors to the degree possible the type of living situation most residents will experience when in the community. A step-wise community reintegration focus.</p>

3. **Describe any innovations that you would like to incorporate into a new program or design.**

<p>Telemedicine, OT facility that mirrors to the degree possible a real-world work environment (e.g., a café that sells food to patients and staff), therapeutic yard space (e.g., mindfulness garden with soothing feature like a waterfall), high walls instead of chain link, warm residential feel (e.g., natural colors, ACROVYN doors, art work), where needed advanced security features that do not look "hardened" (e.g., windows that appear standard but have high attack-rated window panes, locked ceiling grids that appear standard but have grid locks in the above crawl space), comfort room, exercise/wellness space, plenty of windows for natural light, and plenty of functional program space for group and individual therapy.</p>
--

For staff, individual offices with natural light, exercise room, adequate locker space for staff who do not have offices, large break room with adequate food storage space and something like an Avanti Market, a wellness room (e.g., for lactation practices, personal medication storage, room for yoga practices), and parking that is adequate and complies with ADA code standards.

4. **List group program spaces that would be needed/desired to support the programs. (i.e. - OT, Music Therapy, Vocational Training, etc.)**

We could look at the Bill Anthony "treatment mall" concept where each treatment room has a dedicated function (e.g., Music therapy room, illness management room) and is held off the living unit.

5. **List spaces/needs to support exercise and recreation programs.**

See above. Adequate exercise space and equipment for both patients and staff.

6. **Describe your philosophy on seclusion? What type of spaces besides a seclusion room could be used for de-escalation?**

Philosophy is to do everything we can to prevent seclusion and hopefully never use it. We could design space that could be used as areas for reduced stimulation for staff to utilize as an area to provide de-escalation. If a seclusion and restraint room is required, keeping it in an obscure area would be ideal so that patients are not constantly reminded of these coercive procedures (trauma-informed care principles).

7. **Please share your ideas for enhancing the patient and family visitation experience.**

A warm and spacious visitation area. Having an area within the visitation area that has a play area for visits that involve children. Having app-based video conferencing that is easily accessible to families.

8. **Describe the potential role that the community could play into the program and are there any spaces that could be co-utilized by the community.**

Large spacious meeting rooms that are accessible from on (for staff) and off (community members) unit. The meeting rooms would have tele-video equipment and televisions with internet capability.

Please return the questionnaire to Larry Covey by October 14th, 2019.

We are looking for some feedback on assessing the programmatic and functional needs of a new 16/48 bed facilities for DSHS. The following information will help inform our discussions that will be had on October 21st. To prepare for this meeting please fill out the following questionnaire.

Note: Please return the questionnaire to Larry Covey by October 14th.

1. **Name:** Melena Thompson **Title:** Director, Policy and Legislative Affairs BHA

2. **Briefly describe the unique patient population needs and length of stay for the following programs:**

<p>E&T: Assuming we are talking about an E&T that is providing “short term stays” this would be limited to individuals who are committed for an initial 72 hour commitment and then potentially a 14 day commitment under RCW 71.05. This can be extended based on a court approval or become an “single bed certification” to provide services for a period longer than 72 hours.</p> <p>This population is the most acute population served. Must meet the following criteria Diagnosis of a psychiatric illness and a determination that one or more of the following: Danger to self or others Serious harm to property Grave disability due to cognitive impairment</p> <p>Often under or unmedicated with significant psychological distress. Treatment program often limited to medication interventions, brief intervention counseling and social work to reconnect with community resources and discharge</p>
<p>90-180 day: These individuals continue to meet the criteria above for civil commitment and are post the 14 day commitment.</p> <p>Due to the length of stay additional resources are needed for long term support including large movement and activity areas, treatment space including areas for group treatment. Outdoor space.</p> <p>Space for skill building and ADL training</p>
<p>Step Down: Limited yet not secure egress, space for skill building, large movement activities and outdoor space. More of a “home like setting”</p>

3. Describe any innovations that you would like to incorporate into a new program or design.

Considerations for options if the population served is DD or Older Adult with specific space and design needs for accessibility, low stimulation, durability (wheel chairs, walkers, hand rails)

We are looking for some feedback on assessing the programmatic and functional needs of a new 16/48 bed facilities for DSHS. The following information will help inform our discussions that will be had on October 21st. To prepare for this meeting please fill out the following questionnaire.

Note: Please return the questionnaire to Larry Covey by October 14th.

- | | |
|---|-----------------------------------|
| <p>1. Name:
Brian Waiblinger</p> | <p>Title:
DSHS-CMO</p> |
|---|-----------------------------------|
-

2. **Briefly describe the unique patient population needs and length of stay for the following programs:**

<p>E&T: These individuals are often unmedicated in the community and may have significant psychiatrist symptoms and resulting behavioral problems. They may also have untreated medical needs and need for outpatient referral. They may not have current outpatient treatment and will need to have discharge planners to work on establishing care, restarting benefits if needed, etc. May require a larger personnel space zone in order to feel safe. Tend to be more aggressive in response to psychosis. Recreational therapy can be important as can distraction and relaxation modalities.</p>
<p>90-180 day: These individuals have usually stabilized to some degree and are less likely to have significant violence/aggression in response to psychosis. They may have long-term medical issues secondary medications or poor self-care and will need access to outside appointments (dental, vision, PT, podiatry, etc). These individuals will likely benefit from intensified vocational training. Communication and collaboration with outside agencies is key and they may need to have visits for housing.</p>
<p>Step Down: This tends to be more skills based and so will need more intensified occupational and vocational services. They may benefit from CBT and DBT and other skills based instruction but would likely be the least acute of the three.</p>

3. **Describe any innovations that you would like to incorporate into a new program or design.**

<p>Secure greenspace. Ensuring that all rooms look onto a greenspace and if possible not on chain link fencing, utilities, etc. Dedicated telepsychiatry space. Consider having clubhouse space Additional family meeting rooms/activity rooms Having a secure "office" where patients can have an appointment with their provider to practice. OT facilities to help learn cooking skills, shopping etc.</p>
--

4. List group program spaces that would be needed/desired to support the programs. (i.e. - OT, Music Therapy, Vocational Training, etc.)

See above.
OT/RT
VT training space
Secure green space for gardening/meditation
Exercise room
Outdoor exercise space

5. List spaces/needs to support exercise and recreation programs.

OT space
VT space with stove, washer, dishwasher etc.
Exercise room
Covered outdoor as well as open outdoor area
Mixed meditation/gardening space

6. Describe your philosophy on seclusion? What type of spaces besides a seclusion room could be used for de-escalation?

De-escalation techniques and time alone either in a separate area/hallway or their own room is usually sufficient rather than actual seclusion/restraint. Two rooms is optimal. Using the mobile bed technique at ESH/FSCRCP is preferable to fixed beds.

7. Please share your ideas for enhancing the patient and family visitation experience.

More private areas, green spaces, etc. as above.
Access for secure skyping

8. Describe the potential role that the community could play into the program and are there any spaces that could be co-utilized by the community.

Clubhouse space
Having community assigned case managers with office space in the same facility
Medical clinic in same building or nearby

Please return the questionnaire to Larry Covey by October 14th, 2019.



DSHS 16/48 MEETING NOTES

Purpose of Meeting: Scope Discussion

Date: 09/05/19

Time: 1:00pm via In-person

Discussion Items:

1. Stakeholder Group

- a. Larry is working on this
 - i. Assistant Secretary DSHS
 - ii. Medical Director
 - iii. WSH Bldg 27 staff
 - iv. Larry Covey
 - v. Ken Taylor
 - vi. John Hieronymous
 - vii. Cheryl Strange (former CEO of WSH)

2. Facility Tours Possibilities

- a. Telecare and Recovery Innovations (E and T)
- b. Park Place Mental Health Facility – CLR operator
- c. Building 27 at Western State Hospital
- d. Lake Burien -Navos

3. Download from Larry/Ken

- a. Visioning Session Dates set
- b. Civil 90/180 discussion
 - i. Community based, better success if close to family
 - ii. Complicated cases
 - iii. Risk of elopement
 - iv. Combative
 - v. Some harmless, some are predators
 - vi. Need recreation spaces
 - vii. OT/PT spaces
 - viii. A typical 90/180 3 buildings, (1 E and t, 1 Step down, 1 higher acuity)
 - ix. Fair Start, Third runway, Industrial kitchen
 - x. Want to understand trends
 - xi. Community access to facility, bistro? Meeting spaces
 - xii. Need to look at staffing model, discharge path, long term care options
 - xiii. Demographics info- Larry is working with DSHS research department data team

4. Sites to Evaluate
 - a. WSH site- Lakewood
 - b. Fircrest Site-
 - c. Echo Glen
 - d. Arlington / Snohomish County
 - e. Clark County
 - f. Maple Lane (Lewis County)
5. Contract Development
 - a. Larry needs a proposal

6. Sustainability
 - a. LEED Silver base project
 - b. Upgrade to net zero thru PV

Meeting Schedule Rough Draft

- **Visioning Meeting Number 1 - Sept 30**
 - Ice Breaker/ Intro Stakeholders
 - All consultants attend Goal setting (MEP, Operator)
 - Goal Setting
 - Facility Tours?
- **Visioning Meeting Number 2 - Oct 21**
 - Visual Programming
 - Space Planning
- **Concept Development Meeting Number 3 – Oct 30**
 - Video Meeting for BWBR
 - Item 2
- **Concept Development Meeting Number 4 – Nov 6**
 - Video Meeting for BWBR
 - Sustainability
 - Systems
 - Estimate
- **Pre-Design Report Development 5 Nov 13**
 - Video Meeting for BWBR
 - Sustainability
 - Systems
 - Estimate

- **Pre-Design Report Development 6 – Nov 20**
 - Video Meeting option
 - Sustainability
 - Systems
 - Estimate

SW-BH Community 16/48 Capacity

Visioning Meeting #1
September 30, 2019

Meeting started out with an introduction by Larry Covey

- 48-bed Civil commitment/community treatment facilities consisting of three (3) 16-bed units. One of the facilities would be run by DSHS. The other two would be operated by private operators. Each unit will focus on a different aspect of the continuum of care.
 - Evaluation & Treatment (16-bed) – private operator
 - 90-180 day (16-bed) - DSHS
 - 'step-down' facility (16-bed)- private operator
- "The building should be built for the program, not the other way around"
- Pre-Design is a State requirement: A building over \$5mil or over 5k SF has to go through a pre-design process
- For this project the state allocated more money than what the pre-design cost which means that we can continue moving forward after they approve a potential site
- End of December timeline for the final report
- "This is a big deal! It's a brand-new project type"

Current state/Future State Exercise – refer to Attachment

- We have an opportunity to do something REALLY good
- The facilities are within the 0's, but the programs are stronger within the 2's. Existing does not have enough beds.
- Barriers to 5 – funding constraints – target 4s for pragmatic reasons

Group Comments from the "WHAT":

- Think about how the longer-term facilities support individuals' need to feel safe, restorative, expel energy, etc. (exercise versus yard work).
- May want to consider individual restrooms for long term facilities
- HMH – Habilitative Mental Health program – 2 years average involvement.
- ID (Intellectual Disability) and DD (Developmentally Disabled) populations would need private rooms space rather than double rooms, and more separate programming elements; vocational rehab space?
- Shared services:
 - Separate contracts for food services with each facility
 - May not need to provide the separate company but if it's a central kitchen/laundry, with separate contracts with each provider.
- Would like to incorporate ten strategies from Sweden Study that improve safety by 50%; single patient room, movable seating, low-social density, high spatial density, variety of acoustics, gardens accessible, nature window rooms, nature art, daylight, communal spaces, etc.

- Meeting spaces in existing facilities for private interactions are insufficient. Need to have safe/secure areas for perhaps 2 at a time
 - Family interactions as well
 - Up to 8 people
- Don't forget that our population may be somewhat larger (obesity) in size than most
- Residential feel as much as possible!
- Ease of maintaining these facilities
- "No force first" approach

How do we see the community partnering/engaging with these facilities?

- If we can address the early-onset of psychosis (typically after high school)
- How do we provide services to assist those individuals who need to learn the basics before they burn all their bridges?
- Is there a way to tell the success stories that occur within the facilities?
- What is the program within the facilities and how is that similar or different from the new hospital?
- Make sure to think about the staff as well!
 - Providing spaces of reprieve and restoration. Staff shortages and turn-over.

Policy Makers Success Measurables

1. Waitlist
 - a. Access to bed
2. Length of Stay (through put)
 - a. Delay to discharge, placement
3. Quality of Care
 - a. Outcomes
4. Safety
 - a. Restraint use
 - b. Assaults (patient-on-patient and patient-on-staff)
 - c. Reduced ligature risks

Public Success Measurables

1. Understand whole system
2. Anti-stigma campaign

Fears

- Siting – ability to build
- Moratorium
- Ability to get qualified staff, staff working multiple jobs
- Physical plant out of date quickly
- Through-put in these facilities
- Program – don't know what we want

- Value-engineering
- Decision making

Virtual Tour – Telecare E&T

Average client path:

72 hour (7 days max) initial assessment at the hospital

Another 14 days if needing further detention

Referred to state hospital

Overall approximately 7-21 days

Floor plan:

- Building features – Visual access to nature, use of natural materials
- 12k SF is the standard for Telecare’s prototype (750 SF per patient)
- Administrative staff is essentially the clinical team – offices integrated on the unit
- Sequence of patient intake directly into unit
- Restrooms access from hallway for the shorter-term acute patients versus the longer term would prefer private
- 50% Double rooms – flexibility in the program approaches as well as any gender disparities
- Built ample office space, but still need more
- Staffing challenges? Not currently not an issue as long as it’s located within an urban
- There was some concern about sightlines.
- Open Nurse Station with an enclosed staff charting/work area. Telecare is considering elimination of Nurse Station on future facilities.
- Need to verify local requirements for tele-court. Often need office space for prosecuting and defense attorneys. Judge may also have special requirements.
- Small outdoor area, could use double for program – even more if longer stay

Group Discussion

- When we put them in an environment that is like a jail, they will behave like they’re in jail!

Hospitals tend to have more violence than at the facilities because of the designed environment.

- Sensory rooms versus seclusion rooms!
- Weighted chairs...cushioned but plastic

Design notes:

Bedrooms, not so much bathrooms tend to get more damage on the walls

Other locations that sees a lot of damage: walls with large expanses of no pictures/elements

Building 27 Site Tour

HMH program guided by Dr Mark Cross

- ID/DD Patients typically have longer stays
- Has library / resource center
- Access occupational activities/resources on campus. Program also includes vocational training like wood shop, java café, lawn service and laundry services.

- Patients could use places in their rooms for personal items: TV, game console. Lockable cabs.
Snacks
- Would like Sensory spaces
- Design for cleanability
- Mentioned wanting to have spaces for patients to hang out on the outskirts of a larger group setting.
- Need to have group spaces that can fit all patients on unit as well as staff – need to consider the larger furniture
- Ideally two dayrooms or much larger area
- Would like the ability to dim or switch off night light in patient rooms
- Floors should have coved base
- Would be nice to have computer area for patients

Attachments:

1. 9.30.19 Sign-In Sheet
2. Current-Future State Survey
3. Telecare Floor Plan



2106 Pacific Avenue, Suite 300
Tacoma, WA 98402
bcradesign.com



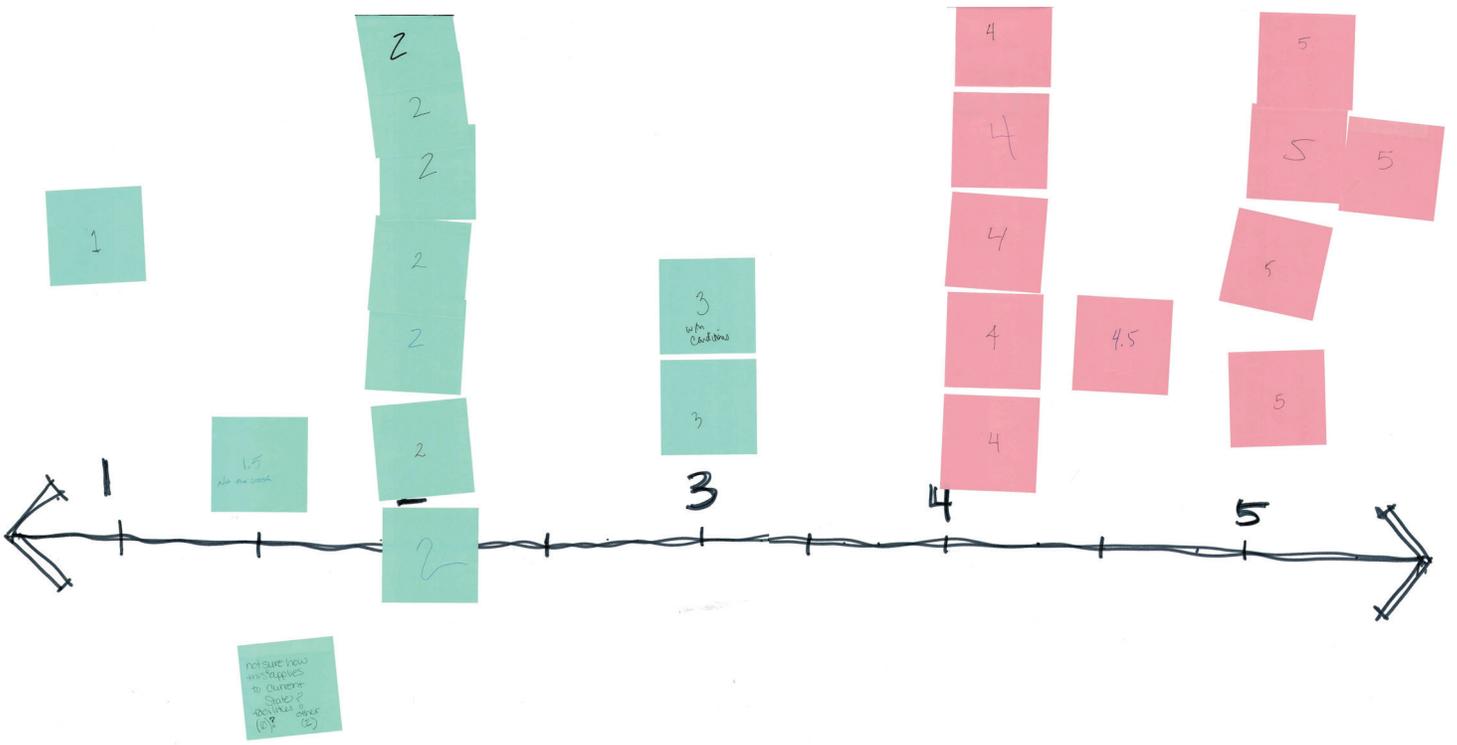
380 St. Peter Street, Ste. 600
Saint Paul, MN 55102
bwbr.com

DSHS Civil 16/48
Project # 19093

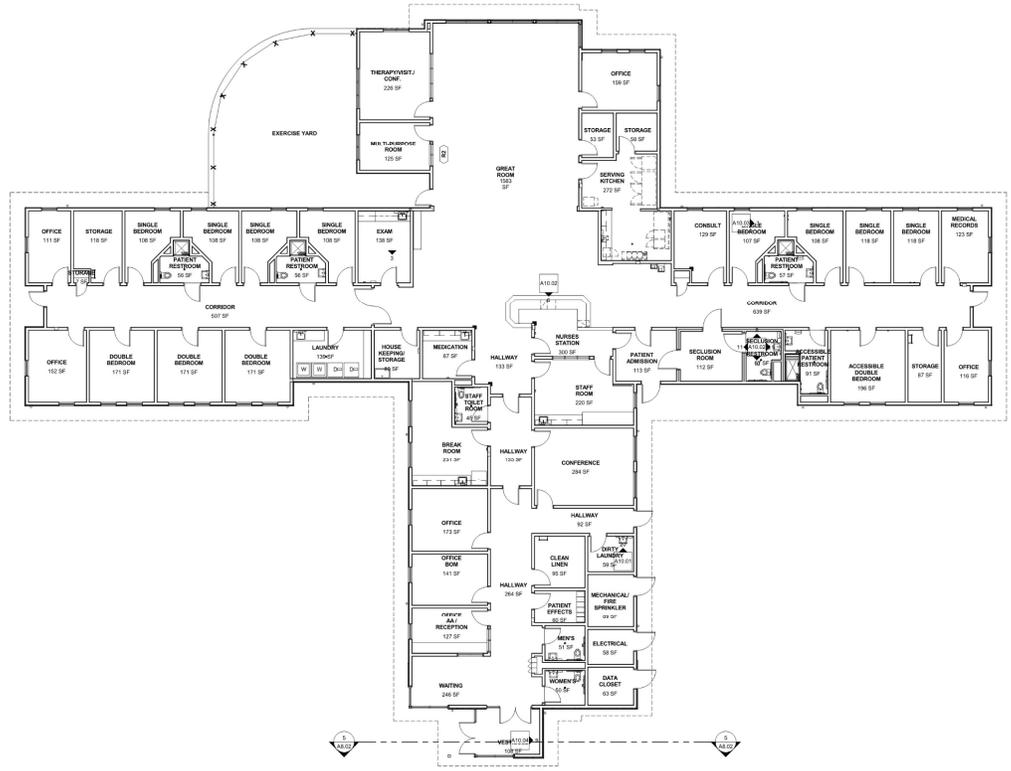
Visioning Meeting #1
Sign-In Sheet

Date / Time of Meeting: September 30, 2019

Mtg. Attendees	Org.	Cell Number	E-Mail
<input type="checkbox"/> STEVE HARDY	DSHS-FIRCREST	360/701-1706	shardysb@dshs.wa.gov
<input type="checkbox"/> CAMERON COLTHARP	Telecare	5107172107	CCOLTHARP@telecarecorp.com
<input type="checkbox"/> Debbie Roberts	DSHS-DDA HA		roberdx@dshs.wa.gov
<input type="checkbox"/> Bryan Zolnikor	DSHS	360 428-4783	zolnibj@dshs.wa.gov
<input type="checkbox"/> SEAN MURPHY	DSHS	360-338-5160	
<input type="checkbox"/> DOUG HIERONYMOS	DSHS	3606645846	doug.hieronymos@dshs.wa.gov
<input type="checkbox"/> Brian Waiblinger	DSHS	360-480-9405	waibbe@dshs.wa.gov
<input type="checkbox"/> Emma Gracyk	BCRA	916-705-8557	egracyk@bcradesign.com
<input type="checkbox"/> Laura Jacobson	BCRA	253.627.4367	ljacobson@bcradesign.com
<input type="checkbox"/> CHARLES ANDERSON	DSHS	360-764-9638	anderch@dshs.wa.gov
<input type="checkbox"/> Jenise Gogun	DSHS	360 338 5005	jgogunjc@dshs.wa.gov
<input type="checkbox"/> Larry Conroy	DSHS	360-444-6662	conroylg@dshs.wa.gov
<input type="checkbox"/> Victoria Nizzoli	BCRA	209.505.3550	vnizzoli@bcradesign.com
<input type="checkbox"/> Natalie Goza	BCRA	253-627-4367	ngoza@bcradesign.com
<input type="checkbox"/> JIM WOLCH, BCRA		253.627.4367	JWOLCH@BCRADESIGN.COM
<input type="checkbox"/> DEVAN SWIONTKOWSKI, BWBR		651.290.1862	DSWIONTKOWSKI@BWBR.COM
		SCOTT HOLMES, BWBR	651.290.1862 SHOLMES@BWBR.COM



TELECARE E&T - FLOOR PLAN



VISIONING MEETING

SW-BH Community 16/48 Capacity

Visioning Meeting #2

October 21, 2019, 9am-3pm

Recap Discussion – lead by Scott Holmes

- Feelings of safety and restoration (specifically with staff)
- Incorporation of strategies that reduce aggression and enhance safety (private rooms, density, nature, daylighting)
- Provide the facility with tools/approaches where restraint and isolation are last option (quiet rooms, nooks, sensory)

Group Comments:

- ID/DD patients typically have longer stays
- Keep in mind what can we do in the design to attract and retain staff
- Creating a platform that can adjust with ongoing changes in these facility programs/approaches
 - Setting the groundwork for flexibility and adjustment depending on the staff desires and work modes; even populations
- Restrooms desired to be off of a private room versus shared off the hallway
- Note made that the nurses tend to congregate around the station versus inside of it
- What is the desired space per person?
- Vocational training required by patients (ID/DD) can be up to 6 hours a day. Something to keep in mind for programming those services.
 - Wood shop, lawn maintenance, café
 - Another route is learning more career-path related options

Establish and discuss “Guiding Principles” – lead by Melanie Baumhover

Review of DSHS mission and values

- The group brainstormed characterizes that would be appropriate for guiding principles. See attachment
- Review
- Melanie crafted vision statement for the group to review and select those appropriate. See attachment of approved guiding principles.
- Can potentially do focus sessions with previous patients, family members, and staff.
 - Friends of Western State have reached out to offer some perspectives from former patients
 - May not necessarily have a staff-focused on as the culture shift is still in flux

Visual Programming

Melanie documented program space needs and will discuss at next meeting.

- The short-term facilities will be part of the 16-bed facility; medical/dental services would be in-house, not necessarily out; opt for the least amount of transportation
- Group-oriented recreational therapy with less of a “gym” and more outdoor space

- 90-180 day patients tend to be less aggressive/violent; need more outside medical care; focus on rehabilitation and teaching independent living; access to court operations; large movement spaces; OT could be a shared space; are there spaces on the unit for medical/dental care services
 - Would want to verify if OT is something that is provided in-house versus outside. Would want to look at frequency
- Step-down facility is similar to the 90-180 days; would have similar needs but have more access to the community; not in 'custody' or under a civil commitment; step-up from community and step-down from in-patient E&T facility; living skills; they have the ability to leave and attend medical appointments, community events, etc. on their own accord
 - Will want access to public transit?
 - If they are at a point of being able to work, then they likely don't need the step-down services
- Double beds: can assist with socialization with clients; can help with square footage costs; could assist with transitioning into another facility; recommendation of 2/3 single and 1/3 double;
 - Recovery-centered environment
 - How much is the MCO daily rate and how does that come into play
 - The ability to afford these facilities
- Cameron to provide contact for operations - Director of Health Services in San Mateo (example grouped facilities that avoided the IMD rule?)
- We have to make sure the E&T if co-located in a building with the other programs is not an "IMD"
- Step-down will be licensed differently and therefore can potentially be in the same building
- It would be good to have spaces to 'separate' from each other (ie: repetitive singing)
 - Think about their habits during recovery (pacing, needing quiet, sleeping)
- Offices desired to be located within audible connection of the center of the facility
- All of these facilities will be "re-thermed" food services.
- Restroom for seclusion area to be accessible off of ante-area versus directly off of seclusion room
- Need to confirm Court procedures/requirements in E&T
 - Court to be shared for all three programs but within the E&T facility due to ease of transporting patients

Massing:

- We set these up as three different cottages, how could they be interconnected in the future?
- Would like to try-out a multi-story with E&T on top (with outdoor patio)
 - IMD roofline requirement is not in the statute
- If we try to build in an urban area, then we will be 'encouraged' to use the land efficiently
- Programs will need Separate entrances and addresses
- Construction type would be needed to take into consideration
 - Fire separation requirements?
- Step-down would have an outdoor space as well that could be utilized with visitors, family, screened with landscaping
- Short-term E&T on its own and then the a two-story 90-180/step-down with a shared lobby and secured outdoor area

- Discussion to make the buildings/program all per the 90-180 model with the intent to provide more flexibility in how the programs may change
- Find the balance of fixtures/finishes (durability) with environments for healing

Site Review/Site Criteria

Current sites:

1. Snohomish County (near Arlington)
 2. Clark County, Peace Health
 3. Fircrest
 4. Western State
 5. Echo Glen
 6. Maple Lane
- Kirkland? Fairfax interested in a 90-180 bed facility
 - Providence partnership in Everett
 - Example criteria
 - Adjacency to metro area
 - Near major transit
 - Environment supports 'healing'
 - Reception from adjacent properties/entities/community
 - Site access to utilities
 - Site topography
 - Existing services
 - Ability to 'lay-out' on site
 - Adjacent community elements (staffing, health services, hospitals, etc)
 - Permitting requirements
 - Sustainable access
 - Building orientation/space available
 - Transportation/public transit
 - Looking at site numerical scoring criteria
 - Need to add some reasoning for the numerical criteria
 - Is there an existing map that shows all the existing programs within Washington?
 - Location could help with E&T distribution/feeders into the 90-180s
 - Community/Resource bucket



Scott leading the group during visual programming

Attachments:

1. 10.21.19 Sign-In Sheet
2. Guiding Principles – Raw Notes
3. Guiding Principles - Statement

DSHS Civil 16/48
Project # 19093

Visioning Meeting #2
Sign-In Sheet

Date / Time of Meeting: October 21, 2019

Mtg. Attendees	Org.	Cell Number	E-Mail
<input type="checkbox"/>	DOUG HIERONYMUS	DSHS 360 470-8460	doug.hieronymus@dshs.wa.gov
<input type="checkbox"/>	CHARLES ANDERSON	DSHS (509) 540-2004	anderch@dshs.wa.gov
<input type="checkbox"/>	Bryan Zolnikov	DSHS (360) 628-4783	zolnibj@dshs.wa.gov
<input type="checkbox"/>	Katy	DSHS (360) 870-0868	katy@ds...wa.gov
<input type="checkbox"/>	LARRY CANNON	DSHS 360-2028-6402	cannonl@dshs.wa.gov
<input type="checkbox"/>	MELENA THOMPSON	DSHS 360-907-7543	thomp.m16@dshs.wa.gov
<input type="checkbox"/>	Jenise Gogan	DSHS 360 338 5005	goganjc@dshs.wa.gov
<input type="checkbox"/>	Brian Wauslinger	DSHS 360 902 7799	wauslbe@dshs.wa.gov
<input type="checkbox"/>			

Regionally distributed

Variety of needs – variety of resources

Patient

- Residential like (not hospital like)
- Safe – zero injuries, harm to self, staff safety.
- Healing Environment
 - Access to nature – green space
 - Hopeful
 - Healing
 - Warm atmosphere
- Designed to encourage an environment of care – integrate staff and patients
- Recovery
- Rehabilitation – independent living in the community
- Progress
- Fosters self-choice, decisions for themselves
- Inviting – to both staff and patients, families

Families

- safe & inviting.
- Feel loved one is safe.
- Space to be a family
- Inviting – to both staff and patients, families

Staff

- Employer of Choice (from DSHS Strategic Priorities)
- Recruitment & retention.
- Amenities, parking, break, exercise. T
- Down time (exercise, breaks, respite/restorative spaces)
- Empowerment to do their best work
- Inspire and support staff
- Accountability
- Inviting – to both staff and patients, families
- Protect privacy of staff from patients

Stewardship

- Intentional design
- Create operational efficiencies – staff process, financial operations
- Flexibility/adaptable for future use
- Environmental stewardship – net-zero/net-zero capable

Community

- Community appropriate – fit into neighborhood, ‘northwest style’.
- Demonstration facility
- Community asset – invite the community.
- Break down barriers – less scary
- Partnerships
- Wellness Center – center of wellness
- Protect privacy of patients, staff from patients. Photographing not possible of patient areas

A facility for mental wellness of staff, patients, family and community members.

Patients

- A. **Warm, residential environment that supports patient recovery and progress** in their treatment. A healing environment with a goal of zero injuries, where patients and staff are integrated in partnership.

Families

- B. **Families are welcomed and included.** They are comfortable with the safety of their loved ones and themselves.

Staff

- C. **The Employer of choice** where staff are supported, empowered, high-performing and inspired. Staff are integrated with patients, are safe from harm and have staff privacy protected

Community

- D. **A Community Asset** / Center of Wellness that invites community members into the facility to break down barriers and create partnerships while maintaining patient privacy.

Stewardship

- E. **Flexible, adaptable facilities** that work today and into the future, where design decisions are intentional. Net-Zero energy capable for environmental stewardship

DSHS Community 16/48 Meeting Agenda Nov 7, 2019

1. General Questions:
 - a. Should the building(s) be designed to keep people inside?
 - i. Windows are breakable, or windows are attack resistant to slow down people trying to break out, or break someone out
 1. Patient bedrooms have laminated glass and tempered. Step down from what is put in a jail. Regular window sill heights.
 2. Non-patient areas are basic commercial windows
 - a. In the report – have areas identified where there are high-abuse or damage-prone and what products would be used to help with this.
 - ii. Concern that patients might try to break through the walls or room? How long (in minutes) do we need to delay a patient?
 1. Will be answered with type of construction when chosen
 2. This could be a homework
 - iii. Concern that someone from the outside with power tools could/might break/cut someone out? How long (in minutes) do we need to delay someone from the outside with tools?
 1. This is not a concern.
 - Yes, they should all be designed to keep people ‘in’. Not all will utilize the system at time of occupation. This will depend on the provider and need.
 - Chart the differences between the different programs; identifying elements that would be universal versus specific to the program; write what may be cost impacts too.
 - b. Are there any patients/programs that you anticipate will NOT require ligature resistant spaces, even if they are alone? (any program types would not be an option for patients who may be identified as suicidal)
 - This is a program question but most, if not all areas will need to be anti-ligature; the Step-down facility may not need this...or there’s a zoned area within the design. May want to have all facilities be consistent with hardware/anti-ligature approaches. Allows for flexibility in the long-term.
 - c. What level of durability is preferred?
 - i. Standard gypsum walls
 - ii. Impact resistant gypsum walls
 1. Preferred option
 - iii. Concrete masonry units or Burnished block walls
 1. Do not want CMU at all
 - d. Will patients be locked in the building by staff?

- kitchen, nursing/staff areas, and head load factors (so south-facing versus north); thermostats need to be incredibly secure and tamper-proof
 - 15% improved energy conservation would be a great option
- iv. Desired room temperature setpoints for heating and cooling?
 - 1. Homework
- v. Any humidity requirements?
 - 1. No
- vi. Any high load electronics?
 - 1. Not known at this time; there will be UPSs in the data room and localized server which will have additional requirements
- vii. Acoustic requirements?
 - 1. Design phase
- b. Control systems preferences?
 - 1. Not known at this time; The current campus' has a centralized control system which may tied into it but should plan for its own.
 - 2. Since we are going to have two, 16 licenses that will be independently operated, we have to have some way to back-charge those facilities; if it's embedded into the control system, there needs to be a way to pull that information out easily; Would that info need to be provide to the operator in order to get funding from Medicare?
 - 3. Common outdoor areas – does the state pay for irrigation/maintenance costs? Should be looked at during the design phase.
- ii. Preferred installing contractors?
- c. Will medical gases be required?
 - i. If so what gases?
 - ii. Which will be hard piped/ which will be point of use bottle?
 - Portable tanks only
- d. Assuming patient spaces will require ligature resistant design, is it preferable that staff spaces use the same fixtures for ease of maintenance, or prefer staff spaces do NOT include ligature resistant designed plumbing fixtures?
 - 1. No in the staff spaces; can pull this question into the programming stage
 - ii. Any other locations without? (public or family spaces?)
 - 1. Public restrooms and business side of spaces
 - iii. Preferred manufacturers?
 - 1. Homework for Larry
- e. Is PEX piping acceptable?
 - i. Homework for Larry
- f. Is PVC sanitary waste and vent pipe acceptable?
 - i. Homework for Larry

4. ELECTRICAL GENERAL INFORMATION

- a. Will the functional program allow for patients that require life support?

- i. Ventilators, etc.? This is not foreseen as a requirement as that level of support needed would likely mean they're in a hospital.
 - b. Will the functional program allow for patients to be medicated to the point they are not ambulatory or incapable of egressing the building without assistance?
 - i. Likely not; this will need to be answered by program team.
 - c. Will piped medical gases be provided in the building?
 - i. Need to be answered by program needs; Would this be more of a portable solution versus a standard?
 - d. Will Interview rooms, court rooms, group rooms or multi-purpose rooms have any special needs such as specialized lighting, ambient audio/ video, room recording, panic buttons, remote shunting of power receptacles, security video, etc.?
 - i. Interview room – basic and not anything special;
 - ii. Court room (in E&T) – this will have special items such as AV equipment, microphones, monitors, security cameras; program team needs to confirm what they would require
 - iii. Group/Multi-purpose rooms – these should be basic rooms
 - iv. Larry will be asking about wearable, emergency lanyards/buttons for staff
 - v. Remote shunt could be an opportunity to have a switch at the nurse station to have control in case of an emergency
 - vi. Ambient audio? Bedrooms would not have music/speakers to help with socialization and encouragement to not be in there; conversation now is to try and provide opportunities for control/decisions for the patients and music could be a privilege
 - 1. Break this question down by rooms as homework
 - e. Will Seclusion rooms have specialized lighting (color change LED), external lighting control, audio/video needs, room recording, power receptacles in room (not advised), security video?
 - i. External lighting control, audio/video needs, no power
 - f. Will the facility have built in music system (in patient bedrooms, quiet/sensory rooms, staff respite, or multi purpose rooms)
 - i. Yes;
 - g. Will patient bedrooms, quiet/sensory rooms or staff respite have built in color change LED lighting?
 - i. Yes in the sensory rooms, the bedrooms may be on a different color index as a standard; the nightlight could be the amber spectrum to assist with the ability to check on the patient without disrupting their sleep.
 - h. Will the facility have electronic game rooms or other spaces requiring specialized electrical connections?
 - i. May want to keep something in there for the option
 - i. Should Courtrooms include setup for telecourt, or in person court only
 - i. Set up for telecourt
 - j. Is it desirable to have a “watch tour” system for staff? (key switch or card reader?)
 - i. System that records that staff is ‘checking’ certain places or rooms; this is likely not going to be part of the program
5. STANDBY POWER

- a. Are there Standby Power requirements required by the Owner above code minimum:
 - i. Lighting in addition to egress and exit lights? (additional task or safety lighting)
 - ii. Refrigeration equipment?
 - iii. Receptacles needed on emergency power?
 - iv. Mechanical Equipment and/or Owner's special equipment that cannot be off in a power outage?
 - Requirement is to keep operations for up to 72 hours; go for 96 hours for right now
 - 100% back up power
 - Diesel tank
- b. Is there uninterruptable power source (UPS) requirements needed by the Owner? These would be things that cannot see a power glitch, such as:
 - i. Medical Equipment?
 - ii. Security Systems?
 - iii. Other?
 - Yes to all

6. LIGHTING

- a. Will patient room lighting be controllable from outside the room?
 - i. From hallway via key?
 - ii. Nurse Station?
 - iii. Wirelessly?
 - Clients will have control of the light in their room with anti-ligature fixtures/switches; there should be an override for each room – homework question; the control would be located in the nurse station

7. TELECOMMUNICATIONS

- a. Data/Voice cabling requirements:
 - i. Will Patient rooms have telephone jacks or data jacks?
 1. No
 - ii. For public area patient phones, do you prefer
 1. Stainless steel fixed phones with staff override shut off?
 2. Cordless checked out from nurse station?
 - Will need to be homework question
 - iii. Wireless communication requirements:
 1. Will Patient rooms have wireless capability?
 - a. Yes
 2. Will Offices, Nurse Stations, and other staff areas have wireless capability?
 - a. Plus hard-wire
 3. Will Patient common areas have wireless capability?
 - a. Yes
 4. Will there be separated wireless networks for Visitors? Patients? Staff? Med Records? Other?
 - a. Yes; could require a secure, username/password log-in

- Look at providing a check-out space where video-guided therapy within a specific room
 - Homework – music in patient rooms or sound generators
8. Television requirements:
- a. Will Patient rooms have provisions for televisions?
 - i. No
 - b. Will Offices, Nurse Stations or other staff areas have televisions?
 - i. Break room only
 - c. Will Patient common areas have televisions? Will televisions be provided with override switches for staff control?
 - i. Yes; yes
 - d. Will television delivery be by cable, internet, OTA?
 - i. Yes, yes, maybe
9. Nurse Call System requirements:
- a. Traditional nurse call systems are not required by code. Is it desirable to have a Nurse Call system?
 - i. Yes
 - b. If so, does the Owner prefer a wired or wireless system?
 - i. No preference; nurses have call buttons on them
 - c. If a nurse call system is provided, where will the Owner want devices:
 - i. Patient Rooms - yes
 - ii. Patient Toilet Rooms - yes
 - iii. Common areas – no but in the therapy rooms
 - iv. Staff toilet rooms - no
 - d. Will the facility equip staff with wearable duress alarms?
 - i. Yes
10. FIRE ALARM
- a. Will exterior doors unlock in a fire alarm (This will be subject to AHJ approval)?
 - i. No, they will only unlock in a sprinkler-flow
11. SECURITY
- a. Will patient room windows be electronically monitored? Where will the alarm report to?
 - i. Windows will not be operable, so no
 - b. Will patient room doors be monitored? Where will the alarm report to?
 - i. No
 - c. Will patient room doors be electrically locked? Where will the lock/unlock station(s) be? If so, how will the patient communicate to staff?
 - i. No; but we should look at the ability to lock clients out of their room with a key lock
 - d. Will patients have tracking devices?
 - i. No
 - e. How will security be accomplished? DSHS Staff? Private Security?
 - i. DSHS Staff or provider staff
 - f. Where will Security video be provided:
 - i. Exterior Doors?

1. yes
 - ii. Exterior Perimeter?
 1. yes
 - iii. Interior public areas?
 1. yes
 - iv. Any Patient Rooms?
 1. no
 - v. Where will video be monitored?
 1. Yes
 - vi. Who has access to video?
 1. Whoever is on call
 - g. Where will the facility have wander control? Doors monitored to alert staff if patient breaches specific locations.
 - i. When traveling interior to exterior through doors?
 1. no
 - ii. When traveling interior to other interior locations?
 1. No
 - h. Will bath and toilet rooms lock electrically? If so, where will the overrides be located and who will have authority to override?
 - i. No
 - i. Will the facility use card readers for door opening? If so, Staff only or staff and patient?
 - i. Yes, exterior only; However, the patients needs to be able to come and go freely in the step-down freely (think about the design of these entries)
 - j. Will patient doors be locked to allow patient privacy, or passage function
 - i. No
12. NET ZERO
- a. Roofing system type and parapet wall height, if a low-slope roof is planned?
 - i. Low-slope roof
 - b. Considerations for rooftop or ground mount solar PV array, any preference?
 - i. Everything on the roof

Other notes:

- Adequate crawl space to maintain plumbing easily
 - How does this work with our prototypical slab on grade design?
- 7'-0" interstitial space above for ease of access for mechanical ducts



November 26, 2019

Heating Ventilation and Air Conditioning

The mechanical system will be comprised of a Variable Refrigerant Flow (VRF) system with a Dedicated Outdoor Air System (DOAS) for ventilation air.

Ducted VRF fan coils will be utilized to provide space heating and cooling. Air from each fan coil will be ducted directly to each space served to ligature resistant supply and return grilles. All VRF fan coils will be remotely located on a mechanical platform for ease of access and serviceability. Each fan coil will be provided with a filter rack with a MERV-8 filter.

There will be three DOAS units serving the building. Each DOAS unit will be located inside the building on a mechanical platform. There will be one DOAS units serving the Staff/ Service area and two DOAS units serving the Patient areas. The DOAS unit construction will include an enthalpy to capture waste heat from the building to precondition the ventilation air, MERV-13 air filter on the outside air inlet and MERV-8 filter on the return inlet, electric heating coil, and supply and exhaust fans with Variable Frequency Drives (VFD).

The DOAS units will deliver tempered ventilation air to individual Variable Air Volume (VAV) dampers at each space. The VAV dampers will open and close based upon occupancy status in each space with exception to the Dining/ Dayrooms and Conference rooms. The VAV dampers serving the Dining/ Dayrooms and Conference rooms will modulate based upon CO2 levels in the space (demand control ventilation).

Building relief will be accomplished by using air transfer from the smaller patient rooms, offices, and conference spaces to the larger open Dayroom/ Dining areas. There will be one exhaust VAV damper in serving each Dayroom/ Dining area controlled to a common space pressure sensor to maintain a slightly positive space pressure. Relief for the Staff/ Service area will use air transfer to the Waiting Area. The Waiting Area will utilize one exhaust VAV damper and modulate based upon space pressure to maintain a slightly positive space pressure.

The Mechanical and Electrical spaces will be provided with electric unit heaters for space heating and exhaust for ventilation. Both the unit heater and exhaust fan will be thermostatically controlled.

A BACnet direct digital control (DDC) system as provided and installed by Reliable Controls (or Owner approved equivalent) to include connections required for all HVAC components. The building addition will have its own network controller and operator workstation. The system will be capable of optimal start/stop, time and holiday scheduling, and after-hours override. Each zoned area is to be individually controlled through tamper proof temperature sensors located within each zone. The BACnet control system will meter building power, and domestic water consumption.

The DDC system will incorporate monitoring and control points necessary for scheduling and control.

Plumbing

Behavioral healthcare ligature resistant plumbing fixtures and floor drains are to be utilized for all areas throughout the building including Staff/ Service areas. Lavatories will be provided with low flow (0.5 gpm) aerator faucets. Water closets will be low flow 1.28 gallon per flush. Shower heads will utilize 1.5 gpm flow cartridges.

Sanitary waste and vent piping above and below ground will be cast iron. All bathrooms, mechanical room, and fire riser room will be provided with floor drains. All floor drains will have trap primers installed.

The domestic water piping will consist of Type L copper or PEX for all above ground pipe and PVC Type C-900 for below ground cold water pipe.



Net Zero Energy Pre-Design Study

1648 - Behavioral Health Unit

December 2019 (Draft Report)



Leading Energy Performance

Net Zero Energy Pre-Design Study (Draft)

Executive Summary

The Department of Social & Health Services (DSHS) is positioned to demonstrate leadership in net zero energy performance for the new Behavioral Health Unit (BHU), based on the results of this pre-design study phase. This study evaluates the estimated energy use, renewable energy system capacity and associated rough order of magnitude costs for achieving net zero energy in the proposed 17,154 square foot new 16-bed facility and 51,462 square foot 48-bed facility.

The goal of this study is to identify renewable energy system options using solar photovoltaics (PV) to offset annual operational energy use, achieving net zero energy. Cost estimates for the system options evaluated are provided for consideration, using a range of unit costs for solar PV of \$2.50 - \$3.50/Watt:

			Solar PV Cost Estimates			
16-Bed Facility (Fircrost)	PV Capacity (kW)	Annual Production (kWh)	System Cost (\$2.50/Watt)	System Cost (\$3.50/Watt)	Percentage Offset (Baseline EUI)	Percentage Offset (Target EUI)
Baseline EUI Option	332.6	363,100	\$ 831,500.00	\$ 1,164,100.00	100%	181%
Target EUI Option	186.9	201,800	\$ 465,750.00	\$ 652,050.00	56%	100%
Net Metering Option	99.4	113,500	\$ 248,500.00	\$ 347,900.00	31%	56%

			Solar PV Cost Estimates			
48-Bed Facility (Fircrost)	PV Capacity (kW)	Annual Production (kWh)	System Cost (\$2.50/Watt)	System Cost (\$3.00/Watt)	Percentage Offset (Baseline EUI)	Percentage Offset (Target EUI)
Baseline EUI Option	997.8	1,089,300	\$ 2,494,500.00	\$ 3,492,300.00	100%	181%
Target EUI Option	558.9	605,400	\$ 1,397,250.00	\$ 1,956,150.00	56%	100%

Figure 1: Cost Estimates for Net Zero Energy BHU Facilities

The approximate range for solar PV array installation costs is representative of current market trends and anticipated future reductions as the solar industry continues to scale. Based on this project’s proposed schedule, significant cost reductions may be feasible for installing solar PV. Therefore, a unit cost of \$2.50/Watt is used for the low-end cost analysis for each system option proposed. Additional variables, such as utility rate escalation and maintenance costs are factored into this assessment. The results of this analysis highlight renewable energy system options for achieving net zero energy for both the 16- and 48-bed BHU facilities, supporting operational cost savings, carbon emissions reductions, and alignment with Washington State’s Executive Order 18-01 for net zero energy facilities.

Energy Use Intensity Analysis

The facility is intended to support occupant health and wellness, prioritizing sustainable design while balancing cost-effective operations and maintainability of all systems and equipment.

Net zero energy building performance is typically a result of maximizing passive, active and renewable energy solutions. This framework identifies passive strategies first, such as building orientation and energy conservation opportunities from glazing, a high-performance building envelope, natural ventilation and other site-specific design strategies to minimize energy demands. Active solutions target high-performance, energy-efficient equipment, including heat pump technology or alternative high-efficiency HVAC equipment, LED lighting, occupancy sensors and energy management systems.

These strategies are intended to result in ultra-low energy use and associated operational cost savings, which can then be offset with on-site renewable energy systems to achieve net zero energy performance. Ideally, the renewable energy system capacity is minimized based on the building’s energy efficiency, providing lower installation and maintenance costs. However, a cost premium of 5-10% is anticipated for net zero energy buildings:

	Energy Conservation Measures	Net Zero Energy (Renewables with ECMs)
Office New Construction	1-6%	5-10%
Multifamily New Construction	2-7%	7-12%
Office Renovation	7-12%	14-19%

Figure 2: Cost Premiums for Net Zero Energy Buildings (ILFI, 2013)

DSHS can shield the project from potential risks, safeguarding the ability to meet and expand program needs throughout the building’s lifecycle, by accounting for various market signals. Specifically, these signals include, but are not limited to:

- Implementing an all-electric HVAC system to maximize benefits of on-site renewable energy generation and mitigate financial risk in the scenario that a future carbon tax is imposed
- Obtaining net energy metering, ensuring on-site renewable energy generation is used in-building, providing compatibility for a battery energy storage system
- Deploying grid-interactive capabilities, including demand response, advanced energy metering, and energy monitoring system integration

Additionally, first costs for a net zero energy building are often prioritized for the longest lasting systems. In particular, the building envelope typically presents the greatest opportunity for energy efficiency, where increased R-value beyond code requirements or typical design standards may provide the longest enduring benefits.

Using a national energy consumption database for energy use in similar buildings, based on the square footage and use type, we can establish an energy use baseline and target Energy Use Intensity (EUI) for this project. The Commercial Building Energy Consumption Survey (CBECS) database is used as a resource to evaluate energy use for similar Medical Office buildings. While this is not an exact comparison to the DSHS Behavioral Health Unit facility, it does provide a comparative metric for a 'high-end' baseline and a targeted energy efficiency goal for the new project. Included in the comparison are assumptions for 24-hour operations, with 30 full-time staff anticipated. Building on these assumptions, the project team identified a target EUI of 40 kBtu/sf/year during the sustainability:

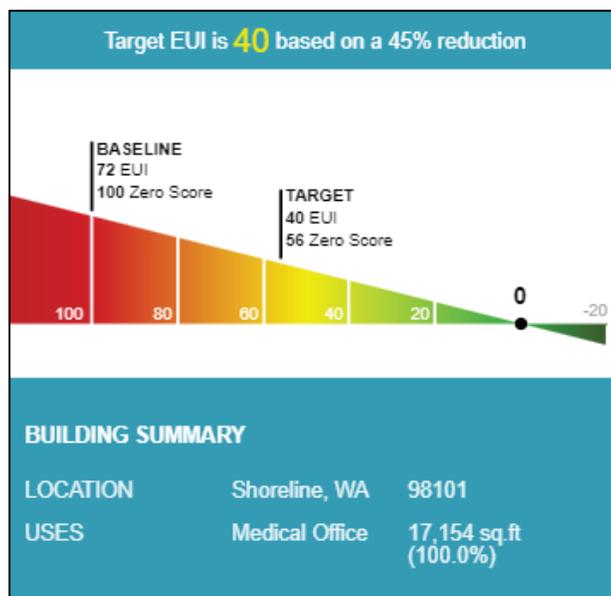


Figure 3: Energy Use Intensity (EUI) Baseline and Target

As shown in Figure 1 above, the baseline and target EUI are used for this study, to assess the approximate range of renewable energy capacity required for achieving net zero energy, where 100% of the building's net annual energy consumption is offset by renewable energy generation.

DSHS specified a target EUI for this project during the sustainability workshop, in order to achieve a level of energy efficiency that is aligned with net zero energy performance. However, both the energy use baseline and target EUI are used for this analysis to identify the optimized strategies for achieving net zero energy on this project.

Renewables & Net Zero Energy

While a variety of renewable energy technologies are available for new construction projects, this report recommends using solar photovoltaics (PV) due to their cost effectiveness, ease of installation, maintenance and operation as an on-site, distributed energy resource.

As discussed in the sustainability charrette, the US solar PV industry has experienced tremendous growth in the past decade, which is fueled by the reduction in installed costs:

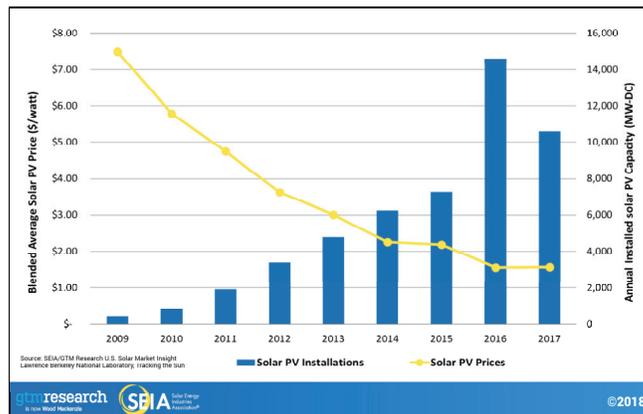


Figure 4: Solar PV Installation Cost & Installed Capacity (SEIA, 2018)

Solar PV array installation costs are typically described using the common denominator of installed cost per Watt of installed capacity (DC-nameplate). The average installation cost per Watt in the United States is now below \$2.00, as represented in Figure 2 above. However, this dataset includes utility-scale, multi-megawatt arrays, which benefit from economies of scale and can be implemented at a lower cost per Watt. Therefore, a unit cost of \$2.50/Watt is used for this analysis, which accounts for prevailing wages.

Solar irradiance, or available electromagnetic radiation from the sun (measured at earth), helps gauge the potential for installing solar at a given site. While the Pacific Northwest is known for overcast, rainy winter weather, long summer days and diffused light result in a higher irradiance (state-wide) than the country of Germany, which is a national leader in solar adoption. The solar potential varies across Washington State, but can be anticipated within a range of 1,000-1,500 kilowatt hours (kWh) per kilowatt (kW) of installed solar PV per year. The National Renewable Energy Laboratory (NREL) provides a solar irradiance calculator, called 'PV Watts', which can help gauge the solar potential for the Fircrest project location:

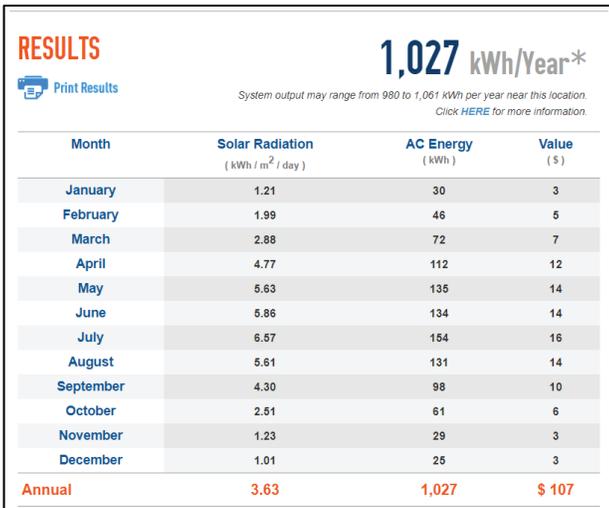


Figure 5: PVWatts Estimate for 1 kW of Solar PV in Shoreline, WA

Installation costs are also driven by the install type, which can be broken out into three distinct applications: rooftop, ground-mount, and carport. While the project team specified that a rooftop-mounted PV array is desired, there are proposed project locations which may be suitable for a ground-mount installation.

This option also supports a partnership approach, where adjacent facilities support the development of a larger PV array and potential microgrid infrastructure, promoting resiliency, safety and security. System options proposed in this study include ground-mount, to provide the project team with options for consideration. For a rooftop array, primary considerations include the roof type and proposed racking installation system. While a standing seam metal roof is likely to provide the lowest cost installation due to available seam clamp products that limit any roofing penetrations, a flat roof is proposed for this project. Therefore, a ballasted racking system is proposed for rooftop solar PV, to reduce the risk of water penetration from flashed-in, fixed footings.



Figure 6: Ballasted racking installation system on flat roof

A solar energy monitoring dashboard is also proposed to support occupant education while providing transparency into the system's daily and lifetime operations. Energy monitoring dashboards typically integrate with a solar PV array's inverter, using metering equipment relayed to a dedicated internet connection. The data provided by the

inverter can be shared to a website, a dashboard within the building, and integrated into a portfolio of DSHS solar installations over time. Energy performance equivalencies may also be integrated into the dashboard so as to display the equivalent number of homes powered, number of trees planted, or tons of carbon emissions saved:

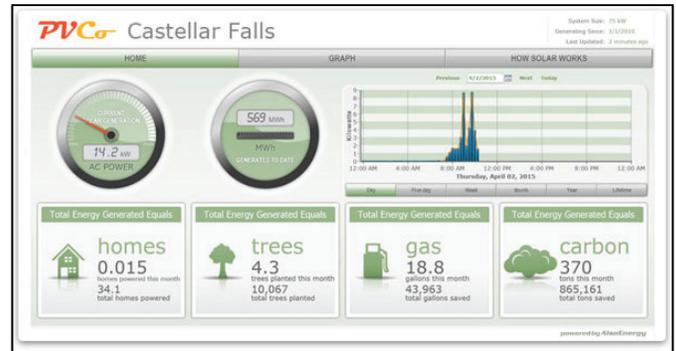


Figure 7: Solar Energy Monitoring Dashboard, Courtesy of AlsoEnergy

Solar energy monitoring is a resource for system maintenance, which can be supported through a production guarantee from the installation contractor. This contract arrangement ensures the system performs as designed, and is often supplemented by a workmanship warranty to cover any necessary repairs within a set time period. As an industry standard, solar PV modules are warranted for 25 years, meaning that the modules will operate within 80% of their original performance rating at year 25. Also stated, solar PV modules will experience no greater than 20% degradation over a 25-year period. Solar energy monitoring can help a system owner know if and how the array, and even individual modules, are performing. This empowers the owner to enforce the warranty if the array or individual modules are demonstrated to underperform within their warranted lifetime.

Executive Order 18-01 for State Agencies

DSHS is a Washington State agency that falls under the Executive Order 18-01, which requires owned or leased facilities to be designed to be zero energy or zero energy capable. A zero energy ready building achieves ultra-low energy use while maintaining sufficient space for the future installation of renewable energy systems to achieve net zero energy. The goal of this mandate is to prioritize energy efficiency and renewable energy integration, as well as to achieve the following outcomes:

- Design the building to make as much energy as it uses annually
- Review green building considerations
- Incorporate monitoring-based commissioning

A zero energy, or net zero energy, building can be understood as a performance outcome. Meanwhile, a zero energy-capable building must incorporate prescriptive requirements to enable net zero energy retrofits after the building is constructed.

Specific checklist items for a zero energy-capable building are not available, though the following solar-ready requirements may provide a useful framework for design considerations:

Site Solar Readiness	Yes	No
All installed system components are new and mounted securely	<input type="checkbox"/>	<input type="checkbox"/>
Proposed system location with required setbacks is documented in plan set or roof diagram	<input type="checkbox"/>	<input type="checkbox"/>
Solar resource verification at or above 80% TSRF or by using prescriptive method.	<input type="checkbox"/>	<input type="checkbox"/>
Solar Ready Photovoltaic	Yes	No
Minimum of 200 square feet un-shaded, unobstructed roof reserved for solar	<input type="checkbox"/>	<input type="checkbox"/>
A 48" x 48" space reserved near electrical panel for inverter and equipment.	<input type="checkbox"/>	<input type="checkbox"/>
¾" or larger non-flexible metal conduit installed per requirements with j-box on both ends	<input type="checkbox"/>	<input type="checkbox"/>
Space for a double-pole breaker reserved in electrical panel opposite the main service feed	<input type="checkbox"/>	<input type="checkbox"/>
Required labeling is present including "Reserved for Solar," "Solar Ready" and code labels	<input type="checkbox"/>	<input type="checkbox"/>

Figure 8: Solar-ready requirements from the Energy Trust of Oregon (ETO)

In addition, the 'Zero Net Energy' (ZNE) project checklist for state buildings includes several requirements for the Pre-Design Process:

- Include ZNE requirement in budget packages
- Identify a team ZNE champion
- Develop and refine Owners Project Requirements (OPR) to reflect ZNE
- Review contract structures and include ZNE
- Include ZNE goal in architect advertisement. Select qualified ZNE team
- Set building energy performance target (EUI)
- Hold design charrettes
- Conduct early design phase energy modeling

This study responds to comments provided during the sustainable design charrette, includes early-phase solar PV modeling, sets an EUI performance target, and provides an understanding of ZNE requirements for the design-phase budget package. An added benefit of this analysis are the connections between net zero energy and LEED v4.

LEED v4 BD+C – Energy & Atmosphere

The proposed Behavioral Health Unit will be required to achieve LEED Silver Certification. Provided the project registers in 2020, the project will remain eligible to pursue LEED Version 4 (v4) Building Design & Construction (BD+C), which has the greatest magnitude of points available in the Energy & Atmosphere (EA) credit category. The net zero energy performance goal for this project therefore has strong alignment with LEED v4 BD+C, including the following credit opportunities:

- EAp2 - Minimum Energy Performance
- EAp3 - Building-Level Energy Metering
- EAc2 - Optimize Energy Performance
- EAc3 - Advanced Energy Metering
- EAc4 - Demand Response
- EAc5 - Renewable Energy Production

Based upon the project's location, additional points are available under the Regional Priority (RP) credit category. The United States Green Building Council

(USGBC) outlines regionally specific opportunities that may align with recent initiatives or codes, providing 1 additional LEED point per RP credit when points thresholds are met in the associated credit category.

For example, if a sufficient number of points under EAc4 and EAc5 are achieved for this project, and the building is sited in Shoreline, Washington, then the following location-specific Regional Priority credits would be also achieved, for a total of 2 additional LEED points:

- RP - Demand Response
- RP - Renewable Energy Production

A preliminary LEED scorecard was developed during the sustainability charrette, which may be modified to address the outcomes of this study.

Solar PV Options Analysis

This report presents solar PV array capacity and layout options that are sufficient to offset building energy use at the project's identified baseline EUI and target EUI, respectively, assuming all-electric building performance. These options are modeled, priced, and sized based upon kWh/year metrics that are calculated to be commensurate with the baseline and target EUI:

	Square Footage	EUI Baseline	EUI Target	kWh/Year Baseline	kWh/Year Target
16-Bed	17,154	72	40	361,969	201,094
48-Bed	51,462	72	40	1,085,906	603,281

Figure 9: Energy Use Intensity Analysis for Baseline and Target EUI

All solar PV array options presented are modeled to assess the associated net annual offset from the energy consumption estimates in Figure 9. These options are also vetted against current energy policy, including interconnection requirements with the utility serving the project location. In addition to the PV array capacities required for the baseline and target EUI scenarios, this report provides an array option that leverages net energy metering.

Net Energy Metering in Washington State

Net metering is a key financial resource for recouping investments in the implementation of a renewable energy system. This option responds to RCW 80.60 for 'Net Metering of Electricity', where a renewable energy system such as a solar PV array can be directly interconnected with a building's electric service. In this scenario, the solar energy is first used within the building, and any surplus solar energy beyond the building's real-time needs is exported back onto the utility grid for a credit at the retail electricity rate. For the scope of this study, the Washington State average retail rate of \$0.09/kWh is used for electricity costs and associated savings.

Net metering is an important value stream for solar, although it is subject to change. Current net metering requirements allow solar PV arrays up to 100 kW in capacity. Systems that exceed this capacity threshold are still allowed, though a line-side connection may be mandated by the utility. In this scenario, solar energy is sent directly to the utility grid and with a billing credit applied below the retail rate. This interconnection process will typically require a power purchase agreement (PPA) between the project Owner and utility company, which establishes the buy-back rate and term length.

Option 1 – Net Metering Option

- System capacity: 99.4 kW (DC-Nameplate)
- Annual Production Estimate: 113,500 kWh/year
- Cost Estimate Range: \$248,500 - \$347,900

Starting with a solar PV array that leverages net metering benefits while consolidating the system on the rooftop area of a 17,154 SF footprint, the following concept design is proposed for a 99.4 kW array:



Figure 10: 99.4 kW Solar PV Array Designed for Net Metering

This system option does not achieve net zero energy under either the baseline or target EUI scenario. However, the array design takes into consideration commercial setback requirements for solar PV arrays, as well as inter-row shading constraints from the 10-degree tilt angle of all module rows. While the array layout is subject to change, it is recommended that this system incorporates access walkways for annual maintenance. The array may utilize a ballasted racking installation to limit roofing penetrations. Using the low-end unit cost of \$2.50/Watt for this system, a total installation cost of \$248,500 is estimated, resulting in a simple payback of 95% of the installation cost over 25

years:

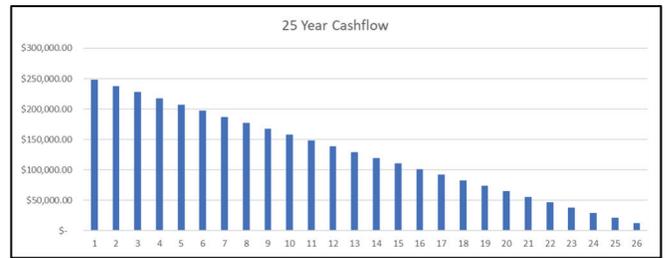


Figure 11: 25 Year Cashflow for 99.4 kW Solar PV Array

This solar PV array option nearly results in the simple payback within the modules' warranted lifetime, particularly by leveraging net energy metering at the retail utility rate. This simple payback calculation assumes annual maintenance costs of \$5/kW-dc and annual utility cost increases of 4%. Additionally, the payback incorporates solar PV module degradation of 20% over 25-years to account for anticipated reduction in output over time. While utility costs will rise on average of 4% annually in Washington State, utility providers reserve the right to increase this rate, as evidenced by PSE's 14% rate increase in 2019. Significant rate increases may be implemented throughout Washington State in coming years, particularly as utility companies transition to carbon-free energy resources under the Clean Energy Transition Act (CETA). On-site solar PV will shield the owner from this volatility, perhaps improving the payback outlook over time.

In order to achieve net zero energy using on-site renewable energy under the target EUI scenario, solar capacity beyond the available roof area may be required.

Option 2 – Net Zero Option for Target EUI

- System capacity: 186.3 kW (DC-Nameplate)
- Annual Production Estimate: 201,800 kWh/year
- Cost Estimate Range: \$465,750 - \$652,050

DSHS expressed interest in pursuing a 100% rooftop mounted solar PV array to achieve net zero energy in the 16-bed facility's target EUI scenario. This option is hypothetical and unrealistic, as it does not account for maintenance access or installation challenges. Regardless, this option is included to demonstrate the magnitude of solar PV required for a rooftop installation to achieve net zero energy:



Figure 12: 186.3 kW Rooftop Solar PV Array for Net Zero Energy

This 186.3 kW array uses 540 modules to produce 201,800 kWh per year, providing a 100% net annual offset of all energy consumed in the 16-bed facility’s target EUI scenario. While this option does meet commercial setback requirements, this array layout is not feasible for installation, maintenance, or providing adequate space for rooftop HVAC equipment. Therefore, an alternative system layout of the same capacity is considered with the inclusion of ground-mounted solar PV arrays.

Ground-mount solar PV arrays may provide the lowest-cost option for any solar array installation type. Due to the solar PV capacity required to offset this project’s anticipated energy demand, ground-mounted arrays, in lieu of substantial building overhangs, may be the most cost-effective option, and the most feasible for installation. However, site preparation costs, including grading, trenching for conduit runs, and security provisions such as fencing, remain unknown and must be taken into consideration when comparing options. Using the target EUI of 40 kBtu/SF/year, net zero energy performance may be achieved for the 16-bed facility with a combination of rooftop and ground-mount solar PV:

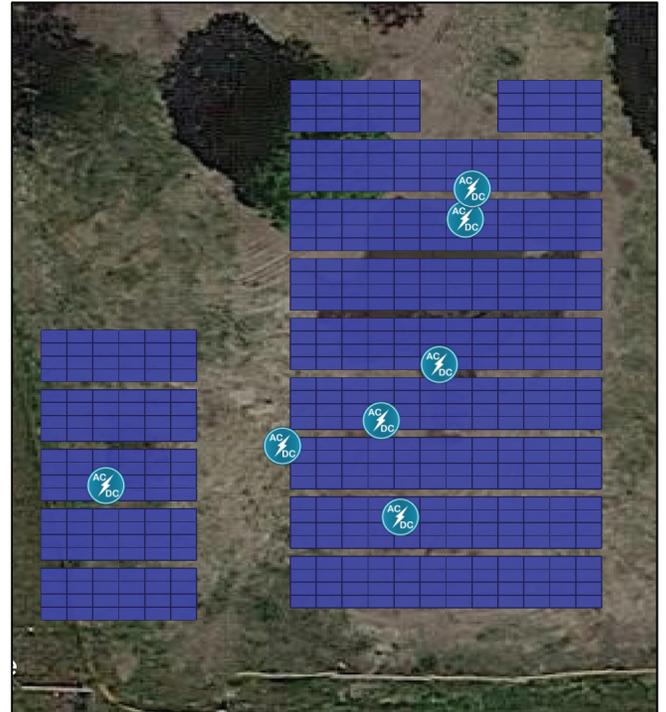


Figure 13: 186.3 kW Rooftop & Ground-mount Solar PV Array

This system configuration includes rows of solar PV stacked with 4-modules per frame at a 10-degree tilt angle, and sufficient space between rows to account for inter-row shading. Using a rough order of magnitude, low-end installation cost of \$2.50/Watt and discounted buy-back rate of \$0.045/kWh for solar PV arrays that are not receiving net metering at the retail rate, a 25-year cashflow analysis identifies no simple payback within the modules’ warranted lifetime:



Figure 14: 25 Year Cashflow for 186.3 kW Solar PV Array

The 186.3 kW array anticipates a total installation cost of \$465,750, producing an estimated 201,800 kWh/year. While the baseline EUI scenario is not anticipated for this project, primarily due to LEED v4 Silver Certification and associated energy efficiency requirements under Washington State Energy Code, achieving net zero energy under this scenario is still evaluated to demonstrate the first cost benefits of efficient building performance when pursuing net zero energy.

Option 3 – Net Zero Option for Baseline EUI

- System capacity: 332.6.3 kW (DC-Nameplate)
- Annual Production Estimate: 363,100 kWh/year
- Cost Estimate Range: \$831,500 - \$1,164,100

Providing a 100% net annual offset of all building energy use in baseline EUI scenario, requires a combination of rooftop and ground-mount arrays. A 332.6 kW array, producing 363,100 kWh annually is estimated to achieve net zero energy for a 16-bed facility at the Fircrest site:

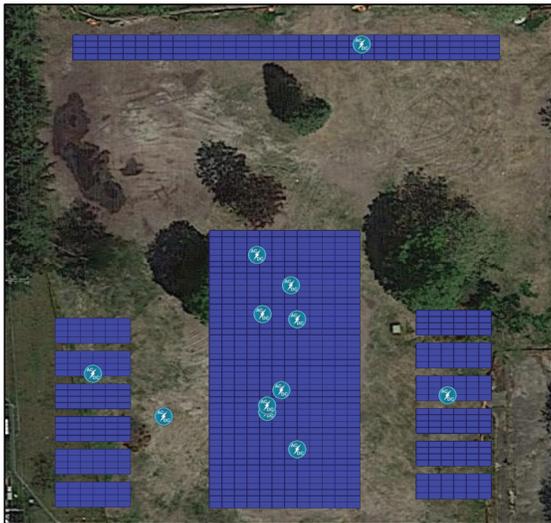


Figure 15: 332.6 kW Solar PV Array

While it may not be feasible to install this magnitude of solar PV capacity at other proposed sites for this project, a 332.6 kW solar PV installation is anticipated to achieve net zero energy under the baseline EUI scenario at the Fircrest site. However, to help gauge the installation cost of a system of this capacity and simple payback analysis from operational cost savings, a 25-year cashflow analysis is provided for consideration using the low-end unit cost of \$2.50/Watt:

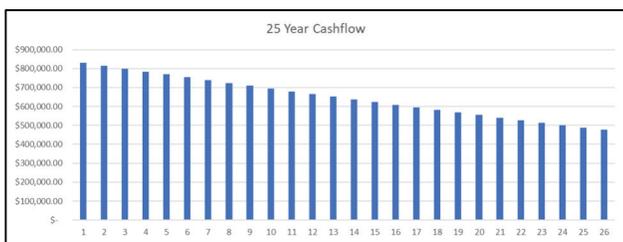


Figure 16: Cashflow Analysis for 332.6 kW Solar PV Array

This system option does not qualify for net energy metering and is anticipated to receive a discounted buy-back rate for all solar energy generated.

A typical rate structuring for power purchase agreements in Washington State is roughly half the retail rate. Using the average state-wide electric utility retail rate of \$0.09/kWh, a buy-back rate of \$0.045/kWh is applied, which results in a 50% simple payback by year 25.

Each solar PV array option for the 16-bed Behavioral Health Unit located at the Fircrest location, including solar capacity, production, cost and percentage offsets from each scenario, is evaluated for the recommended option:

16-Bed Facility (Fircrest)	PV Capacity (kW)	Annual Production (kWh)	Percentage Offset (Baseline EUI)	Percentage Offset (Target EUI)
Baseline EUI Option	332.6	363,100	100%	181%
Target EUI Option	186.3	201,800	56%	100%
Net Metering Option	99.4	113,500	31%	56%

Figure 17: Solar PV Array Options, Estimated Cost & Performance

Based on these results, the 'Option 1 - Net Metering Option' for a 99.4 kW rooftop-mounted solar PV array is anticipated to achieve a simple payback within the solar modules' 25-year warranted lifetime. While future expansion of the system is still feasible, this option does not achieve net zero energy. However, if the project is able to achieve a lower EUI, net zero energy performance is attainable for this solar PV array capacity. For example, if an EUI of 23 kBtu/SF/year is achieved for the 16-bed facility, it is feasible that the 99.4 kW array option may provide a 100% offset of annual energy use, resulting in net zero energy performance.

48-Bed Facility Considerations

DSHS may opt to proceed with a 48-bed facility, which is anticipated to be three separately metered 16-bed facilities. At this early stage in the pre-design process, the 48-bed cost estimates and solar PV array capacities to achieve net zero energy are developed using the preceding analysis for a 16-bed facility.

Site constraints for the ground-mounted solar PV array options may limit the feasibility for achieving net zero energy for the 48-bed facility, especially when considering the baseline EUI. However, potential installation cost savings may be realized for the larger solar PV array capacities required to achieve net zero energy for the 48-bed facility, due to economies of scale.

Net zero energy is feasible for DSHS Behavioral Health Units in Washington State, especially with increases in solar PV module power density, decreased installation costs, and the potential for increasing utility rates. Additional programmatic opportunities may be available for DSHS to claim the benefits of off-site renewable energy systems, such as participation in the Green Direct program with Puget Sound Energy:



Figure 19: Puget Sound Energy's Green Direct Program (pse.com)

Looking holistically at the program, function and goal of the Behavioral Health Units and DSHS mission, as well as Executive Order 18-01's mandate, there is strong alignment with net zero energy for these facilities, regardless of the renewable energy procurement method. On-site renewable energy installations provide increased potential for resiliency benefits,

when considering the inclusion of battery storage and microgrid system implementation. However, participating in a program such as Green Direct offers a low risk strategy to save utility costs over time, while achieving net zero energy from a remote installation.

Site Selection & Optimization

The sites identified for the 16- and 48-bed facilities will play an important role in these projects' ability to achieve net zero energy. In particular, the buildings' massing and orientation may dictate the required capacity and system performance of on-site solar PV array. For example, orienting the facility to optimize solar potential includes considerations of current and future shading, as well as the azimuth, where a south-facing roof area provides for optimal solar PV performance. Additional coordination of rooftop equipment, such as HVAC systems may limit the available roof area for solar PV. As the building design, orientation and site selection is finalized, solar PV array capacity, location and system performance may be evaluated to achieve net zero energy. Evaluating the 16-bed facility at the proposed Maple Lane site option, net zero energy is anticipated to be feasible with a 186 kW rooftop solar PV array:



Figure 19: Maple Lane Site Option for 16-Bed Facility

The 48-bed facility is anticipated to replicate the massing and available roof area for the 16-bed facility. Therefore, net zero energy is anticipated to be feasible for both the 16- and 48-bed facilities.

Conclusion

The Washington State Department of Commerce provides a Zero Net Energy Toolkit for state agencies pursuing this performance outcome from the pre-design, design, construction and occupancy phases of a project. Tools and resources are provided to educate and empower project teams to design and develop net zero energy buildings,

understand requirements, and prepare materials for funding and compliance:

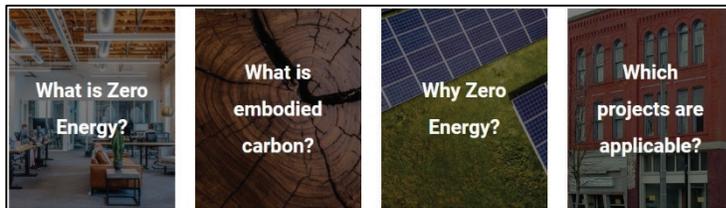


Figure 20: ZNE Toolkit Resources from WA Dept. of Commerce

Pre-design project meetings highlighted potential sites proposed for the Behavioral Health Unit facility. Each site is evaluated for solar potential below:

Site Name	Solar Potential	Notes
Fircrest	High	No southern shading, highest priority site for net zero energy
Maple Lane School	High	Partial shading to the South of proposed project location, although potential for adjacent solar PV and microgrid development with DOC
Western State Hospital	Medium	Limited or no shading at project site, prioritized for net zero energy
Echo Glen	Low	Shaded site not suitable for solar, requires tree removal is coordinated with DNR
Snohomish County Site	TBD	To be determined
Clark County Site	TBD	To be determined

Figure 21: Site Assessment Matrix Ranking Net Zero Energy Potential

Additional analysis is required for each specific site to understand potential shading or space constraints for installing solar PV. The primary focus for solar site assessment is potential shading to the south of the project location, which may obstruct solar access.

The south-west area of the Fircrest site presents no solar obstructions, resulting in 100% of the Total Solar Resource Fraction (TSRF) available for solar PV energy generation at this location. As an industry standard, solar PV installations are not recommended for project locations that present less than 75% of the TSRF at a given site. While site improvements may improve the TSRF at all proposed locations for the new facilities, the Fircrest site is evaluated for net zero energy.

The next steps for this analysis will be to finalize the roof plan during later stages of the design, coordinate HVAC equipment location, and update the solar PV array layout. Net zero energy is presumed to be achievable at the locations identified to have medium or high solar potential, pending an energy model with all specified equipment, solar PV array layout, cost estimates and bid procurement language.

Emerging technologies such as Vehicle-to-Grid (V2G) applications for 2-way electric vehicle charging, battery energy storage systems (BESS) and demand management applications may further support the achievement of net zero energy performance.



Washington State Department of Social and Health Services

Transforming
Lives

REPORT TO THE LEGISLATURE

Predicting Referrals for Competency Evaluation

As required per Engrossed Substitute Senate Bill 6032 (Chapter 299, Laws of 2018)

December 1, 2018

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Executive Summary

Engrossed Substitute Senate Bill (ESSB) 6032 (Chapter 299, Laws of 2018) directed the Department of Social and Health Services to develop and implement a predictive modeling tool to identify persons with behavioral health needs who are at high risk of future involvement with the criminal justice system. To meet this directive, this report describes a predictive model developed for Medicaid enrollees and the target outcome of a referral for a competency evaluation. This approach reflects several considerations including:

- The predominance of Medicaid beneficiaries in the population of persons with behavioral health needs involved in the criminal justice system;
- The potential for Medicaid-contracted integrated managed care plans and behavioral health organizations to implement behavioral health interventions to reduce the likelihood of arrest for their high-risk enrollees; and
- The urgency to improve outcomes for persons in the Trueblood class who are at risk of involvement in the forensic mental health system.¹

Our model predicts the target outcome of a referral for competency evaluation within the following 6 months. We calibrated the model using the experience of Medicaid enrollees age 18 to 64. To parallel a risk-scoring process that could provide regularly updated risk information to Medicaid managed care plans, observations used to calibrate the model were derived from “person months” of Medicaid enrollment spanning January 2015 to December 2016. Predictive accuracy was assessed using a validation sample of coverage months spanning January 2017 to October 2017.

In addition to the competency referral outcome used to calibrate the predictive model, we constructed a broader set of outcomes to better understand the experiences of persons identified as high risk by the model. The additional outcomes examined in the six-month follow-up period included: any arrest (whether or not the arrest led to a competency evaluation referral), any psychiatric hospitalization (whether or not that hospitalization was for competency evaluation or restoration services), use of mental health crisis services, homelessness, or death.

While our final statistical model provided a satisfactory level of predictive accuracy based on conventional statistical criteria, we analyzed the validation sample to assess whether the model would be sufficiently predictive to support targeted interventions. Based on this analysis we found:

- Forensic evaluation referrals are rare. Even in the top 10 percent of the risk pool, fewer than one percent experience the outcome of a referral for a competency evaluation within 6 months.
- Extreme risk thresholds such as the top 0.1 percent or 0.01 percent of the adult Medicaid risk pool would be appropriate for intervention targeting. At these

¹ In April 2015, a federal court found in the case of Trueblood v DSHS that the Department was taking too long to provide competency evaluation and restoration services. As a result, the State has been ordered to provide court-ordered competency evaluations within fourteen days and competency restoration services within seven days. The Trueblood class includes individuals detained in local jails awaiting competency evaluation or restoration services, and individuals previously receiving competency evaluation and restoration services who are released and at-risk for re-arrest or re-hospitalization.

thresholds, 20-40 percent of the validation sample experienced a competency evaluation referral in the six-month follow-up period.

On an annual statewide basis, the top 0.1 percent risk threshold would identify about 2,000 unique individuals for intervention, while the top 0.01 percent risk threshold would identify about 300 unique individuals for intervention.

Prior experiences in the forensic mental health system are by far the most important information in predicting future competency evaluation referrals. Rapid-cycle linkage of managed care enrollment with data from the recently implemented Forensic Data System (FDS) offers the most timely opportunity for identifying enrolled Medicaid beneficiaries who are at high risk of a future competency evaluation referral. The DSHS Research and Data Analysis Division is developing processes to link FDS data with ProviderOne managed care enrollment data. It is reasonable to expect that a mechanism for regularly sharing the results of that linkage with MCOs and BHOs for their currently enrolled members could be in production by July 2019. This timeline assumes progress continues to be made to improve FDS identifier quality.

We found that about half of Medicaid beneficiaries with the highest risk of future involvement in the forensic mental health system are homeless or unstably housed. Almost all (about 90 percent) have a substance use disorder. Other important attributes of the high-risk population include:

- A high proportion are from minority groups, reflecting racial disproportionality in the criminal justice system;
- A high proportion reside in urban counties;
- High-risk Medicaid enrollees are likely to experience other adverse outcomes including an arrest or psychiatric hospitalization;
- Some high-risk Medicaid enrollees have significant physical comorbidities (about 30 percent would meet risk criteria for eligibility for the Health Home program);
- A high proportion are enrolled in Medicaid Expansion coverage, presenting favorable intervention financing opportunities due to the higher federal match available for services covered under Medicaid.

Taken together, these attributes point to targeted interventions designed to engage a diverse, complex population with significant rates of homelessness, substance use disorder, and physical condition comorbidities.

We conclude with a discussion of clinical intervention strategies that may be effective in reducing future criminal justice involvement by high-risk patients. We note that the effectiveness of these strategies is dependent on factors such as:

- Developing financing strategies, including strategies for persons who are not enrolled in Medicaid;
- Supporting the readiness of managed care organizations to receive data identifying high-risk Medicaid beneficiaries currently enrolled with them; and
- Building capacity in community behavioral health delivery systems to provide intensive services and supports for high-risk populations.

Scope and Purpose

Engrossed Substitute Senate Bill (ESSB) 6032 (Chapter 299, Laws of 2018) directed the Department of Social and Health Services to develop and implement a predictive modeling tool which identifies persons with behavioral health needs who are at high risk of future involvement with the criminal justice system. To meet this directive, this report describes the development of a predictive risk model using the target outcome of a referral for competency evaluation.

Forensic competency evaluation services are ordered when a court believes a mental disability may prevent a criminal defendant from assisting in their defense.

Competency restoration services are provided when the evaluation finds the defendant is not competent.

ESSB 6032 further directed:

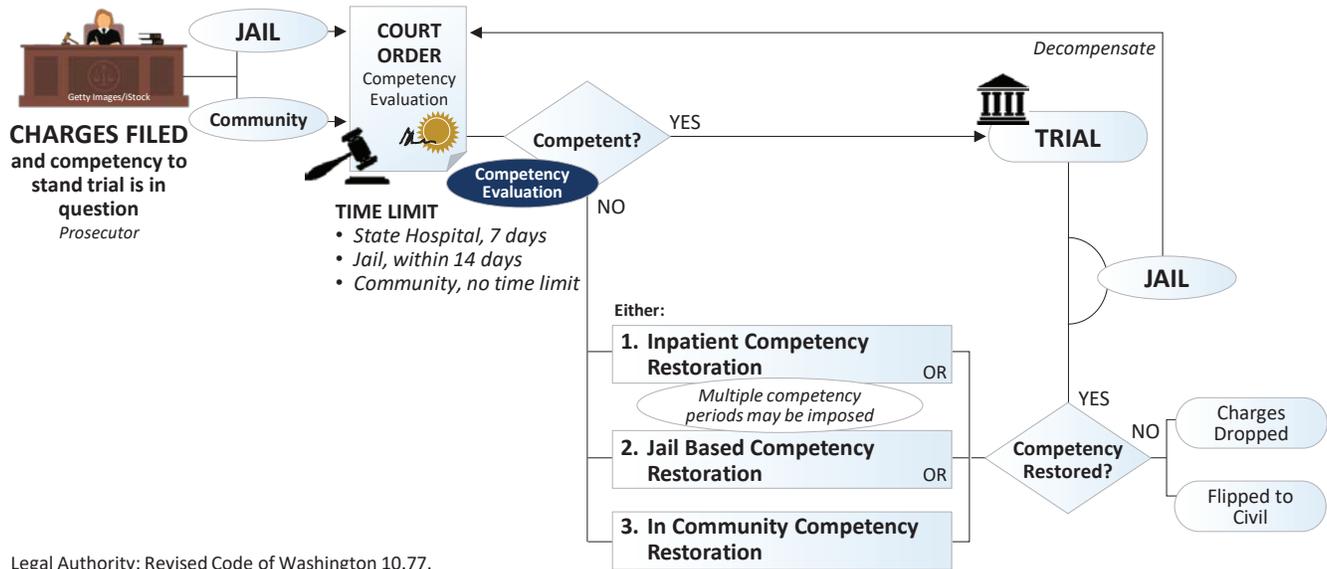
- The predictive modeling tool must be developed to leverage data from a variety of sources and identify factors that are strongly associated with future criminal justice involvement.
- By December 1, 2018, the department must submit a report to the office of financial management and the appropriate committees of the legislature which describes the following:
 - The proposed data sources to be used in the predictive model and how privacy issues will be addressed;
 - Modeling results including a description of measurable factors most strongly predictive of risk of future criminal justice involvement;
 - An assessment of the accuracy, timeliness, and potential effectiveness of the tool;
 - Identification of interventions and strategies that can be effective in reducing future criminal justice involvement of high risk patients; and
 - The timeline for implementing processes to provide monthly lists of high-risk client to contracted managed care organizations and behavioral health organizations.

The first section of this report provides background information about the forensic mental health system and its intersection with the Medicaid-funded community mental health system. The next section describes the development of the predictive modeling tool. The following section assesses the predictive accuracy of the tool, and describes the characteristics of the high-risk populations it identifies. The closing section discusses implementation considerations and evidence-based clinical intervention strategies the tool could support. Detailed predictive modeling results are provided in an appendix.

Background

The forensic mental health system operates at the intersection of the legal and behavioral health care systems, providing competency evaluation services when a court believes a mental disability may prevent a criminal defendant from assisting in their own defense, and treatment for restoration when the evaluation finds the defendant is not competent. The court will then order the defendant to receive mental health treatment to restore competency. Figure 1 provides a high-level overview of the operation of the forensic mental health system.

FIGURE 1.
Competency Evaluation/Restoration Pathway



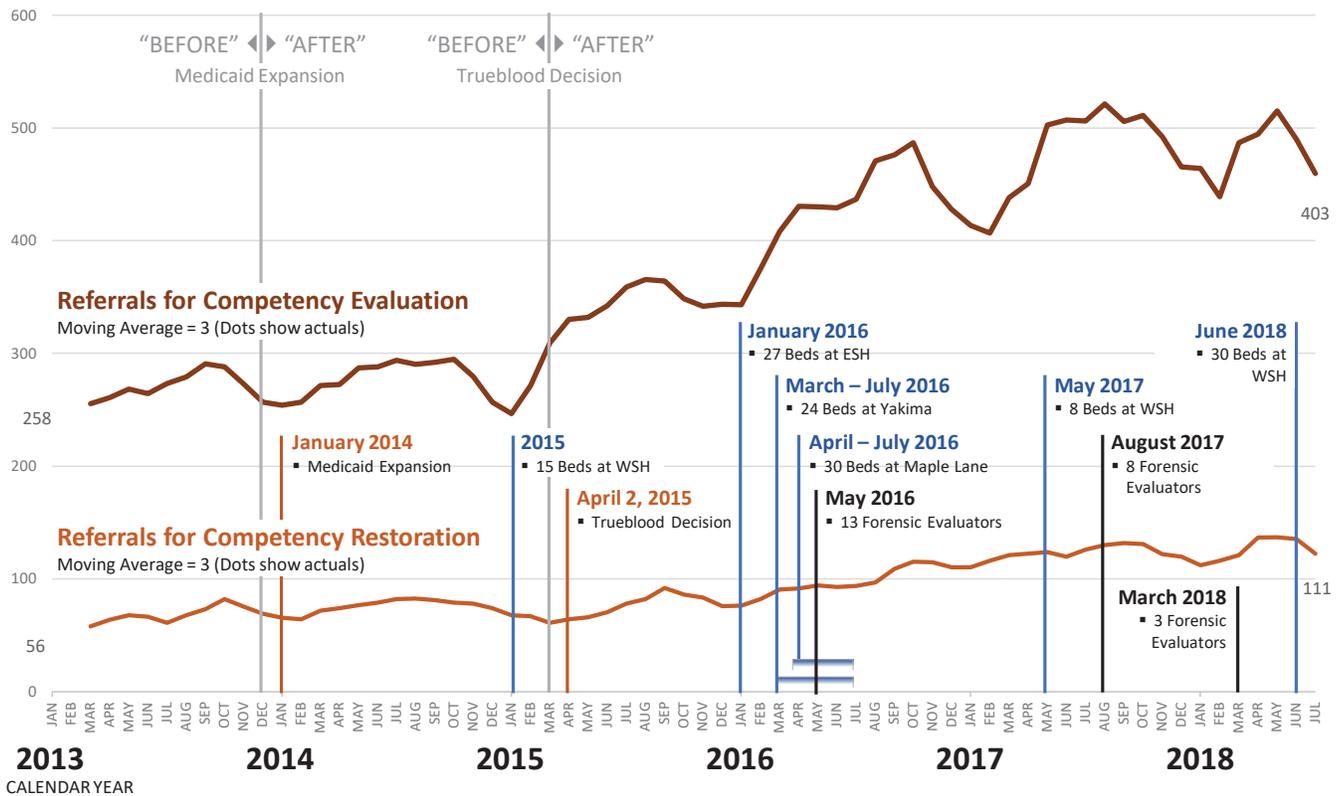
Legal Authority: Revised Code of Washington 10.77.

In April 2015, a federal court found in the case of *Trueblood v DSHS* (Trueblood) that the Department was taking too long to provide competency evaluation and restoration services. As a result of the Trueblood case, the State has been ordered to provide court-ordered competency evaluations within fourteen days and competency restoration services within seven days. The Trueblood class includes individuals who are detained in city and county jails awaiting a competency evaluation or restoration services, and individuals who have previously received competency evaluation and restoration services who are released and at-risk for re-arrest or re-hospitalization.

Figures 2 and 3 put recent trends in competency evaluation and restoration referrals into the context of larger trends in arrests and the timing of two changes in the criminal justice and behavioral health care systems affecting the forensic mental health system:

- Announcement of the Trueblood decision in April 2015, and
- Expansion of Medicaid eligibility under the Affordable Care Act in January 2014.

FIGURE 2.
Competency Evaluation/Restoration Referrals in a Policy Context
 Washington State



NOTES: 1. Total Competency evaluation referrals includes jail, inpatients, and personal recognizance (PR) based competency evaluations. The data also includes Pierce County Evaluation Panel data from January 2016 to July 2018. 2. Total Competency restoration referrals includes inpatient admissions to state hospitals and other competency restorations facilities.

DATA SOURCE: Total Competency restoration referrals includes inpatient admissions to state hospitals and other competency restorations facilities, September 2018.

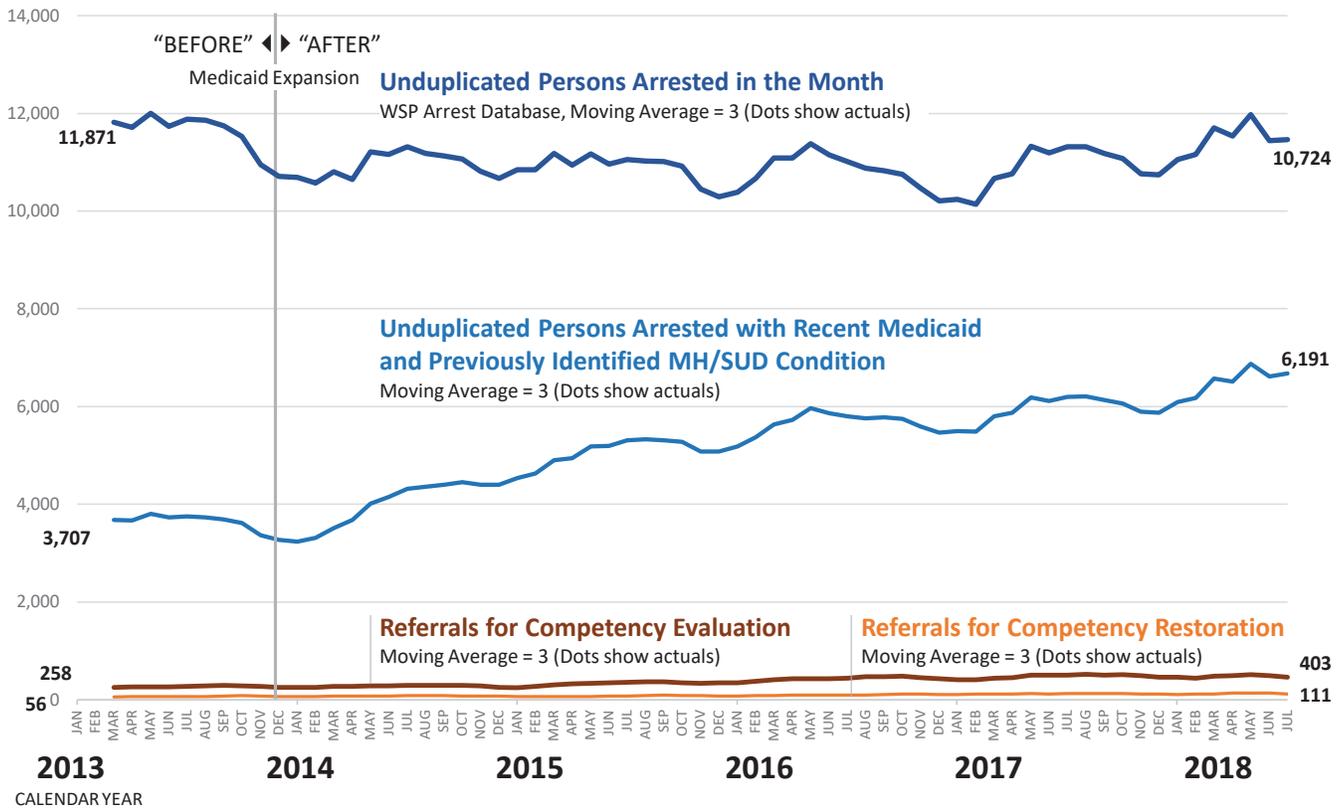
Following the Trueblood decision, referrals for competency evaluation and restoration surged. The timing of the increase in forensic competency evaluation referrals following the Trueblood decision suggests the decision spurred changes in forensic system behavior that have resulted in rapidly rising referral trends.

Meanwhile, Medicaid Expansion has led to a significant increase in the number of persons arrested who both:

- Are currently enrolled or have recently been enrolled in Medicaid and
- Have a mental illness or substance use disorder identified in their recent Medicaid health service experience.

This phenomenon is illustrated in Figure 3 below. As of 2018, most persons arrested in Washington State are currently (or were very recently) enrolled in Medicaid and have a mental illness and/or substance use disorder identified in their Medicaid service experience (58 percent as of July 2018).

FIGURE 3.
Trend in Arrests and Competency Evaluation/Restoration
 Washington State



NOTES: 1. Total Competency evaluation referrals includes jail, inpatients, and personal recognizance (PR) based competency evaluations. The data also includes Pierce County Evaluation Panel data from January 2016 to July 2018. 2. Total Competency restoration referrals includes inpatient admissions to state hospitals and other competency restorations facilities.

DATA SOURCES: DSHS Research and Data Analysis Division, Client Outcomes Database and Washington State Patrol Arrest Database. Total Competency restoration referrals includes inpatient admissions to state hospitals and other competency restorations facilities, September 2018.

In this context, the primary conclusion we draw from Figure 3 is that reducing rates of arrest in the general population largely requires reducing arrest rates among Medicaid beneficiaries with mental illness and/or substance use disorders. In the predictive model described in the next section, we focus on the Medicaid population and the target outcome of a referral for a competency evaluation. This approach reflects a range of considerations, including:

- The predominance of Medicaid beneficiaries in the population of persons involved in the criminal justice system;
- The potential for Medicaid integrated managed care plans and behavioral health organizations to manage interventions to reduce the likelihood of arrest for their high-risk enrollees; and
- The urgency to improve outcomes for persons in the Trueblood class.

As we show later in this report, the population at high risk of a referral for a competency evaluation is also at high risk of (1) being arrested (whether or not the arrest leads to a

competency evaluation referral) and (2) being hospitalized in a psychiatric facility (whether or not that hospitalization is for competency evaluation or restoration services). In other words, the predictive model described in this report effectively identifies Medicaid beneficiaries who are at high risk of arrest or psychiatric hospitalization, in addition to their risk of a referral for a competency evaluation.

Model Development

Our model predicts the target outcome of a referral for competency evaluation within the following 6 months. We calibrated the model using the experience of Medicaid beneficiaries age 18 to 64. To parallel a monthly risk-scoring process, observations used to calibrate the model were derived from “person-months” of Medicaid enrollment spanning January 2015 to December 2016. We assessed predictive accuracy using a “validation sample” of observations derived from coverage months spanning January 2017 to October 2017.

At each monthly observation point, eligible individuals were assessed to determine whether they experienced the outcome of a referral for a competency evaluation within the next six months. For example, a person who was enrolled in Medicaid for all 24 months of the calibration period would contribute 24 observations to the statistical model. In this example, if the person was referred only once for a competency evaluation in July 2016, 6 of the 24 observations used for model calibration would reflect the occurrence of the target outcome (specifically, the six observations spanning January 2016 to June 2016). The predictive model was calibrated using a stepwise logistic regression model.

Figure 4 lists the measurement domains associated with risk factors considered in the model. Most predictive risk factors reflect time-dependent experiences and were measured in time intervals relative to the “index month” associated with the observation. For example, separate indicator variables were developed for the occurrence of a forensic evaluation referral in the month prior to the index month, the second month prior to the index month, and so on. This approach reflects the temporal dimension of the relationship between a potentially predictive prior experiences and the target outcome. For example, recent prior competency evaluation referrals indicate a higher risk of re-referral than events occurring in the more distant past.

In addition to the competency referral outcome used directly in the predictive model, we constructed a broader set of outcomes to better understand the experiences of persons in the high-risk target population. As identified in Figure 4, these additional outcomes included the following experiences in the six-month follow-up period: any arrest (whether or not the arrest leads to a competency evaluation referral), any psychiatric hospitalization (whether or not that hospitalization is for competency evaluation or restoration services), use of mental health crisis services, homelessness, or death.

FIGURE 4.
Prior Risk Indicators and Future Outcomes

PRE-PERIOD RISK INDICATORS EXAMINED

60 months with stratification of events based on recency

- Forensic evaluation referrals
- Arrests
- Convictions
- DOC incarceration
- Psychiatric hospitalizations (community psych, E&T, state hospitals)
- Volume of prior OP mental health services
- Mental illness diagnosis
- Substance use disorder diagnosis
- Homelessness and housing instability
- Receipt of LTSS or DD services
- Use of Basic Food
- Involvement in child welfare system
- Involved with child support services
- Earnings history
- Demographics: age, gender, race/ethnicity



POST-PERIOD OUTCOMES

6 month follow-up

- **Competency evaluation referral**
- Arrest
- Psychiatric hospitalization
- Mental health crisis services
- Homelessness
- Death



Model Results

The final model is described in the appendix, including regression coefficients and odds ratios. Prior competency evaluation history is by far the most important measurement domain in predicting future competency evaluation referrals, reflecting high rates of recidivism in the forensic system. Other factors with a statistically significant (positive or negative) relationship to the target outcome included: age, gender, race/ethnicity, prior DOC incarceration history, and prior psychiatric hospitalization history. Note that we dropped arrest history, adjudication history, and behavioral health diagnosis variables from our final model due to data timeliness limitations in an operational context, with minimal loss of predictive accuracy in the validation sample.²

We recognize the potential concerns about using race/ethnicity information in a predictive modeling context. Because our predictive model is intended to identify high-risk persons for community-based behavioral health interventions to reduce risk of arrest, it may be appropriate to use race/ethnicity information in this modeling context to support the potential to reduce racial disproportionality that currently exists in the forensic mental health system. We would seek further community input before operationalizing a predictive model using race/ethnicity information.

While our final statistical model provided a satisfactory level of predictive accuracy based on conventional “goodness of fit” criteria for logistic regression models (e.g., a c-statistic of 0.79 for our final model), we used our validation sample to further assess

² Restrictions on the ability to share risk factor information derived from non-conviction criminal justice data (e.g., arrest data) also motivated the exclusion of arrest and non-conviction adjudication data from the final model.

whether the model would be sufficiently predictive to be actionable in supporting care management interventions. Table 1 summarizes this exploration by describing the proportion of the validation sample experiencing the target outcome, when stratified by the predictive risk score (first in deciles, then in smaller quantiles at the highest end of the risk-score distribution).

We draw the following conclusions from Table 1:

- **Forensic evaluation referrals are rare.** Even in the top 10 percent of the risk pool, less than one percent experience the outcome of a referral for a competency evaluation within 6 months.
- **The rate of the target outcome is relatively high in the top 0.1 percent and 0.01 percent of the risk pool; these thresholds could plausibly be used for intervention targeting.** Approximately 20 to 40 percent of these groups experienced a competency evaluation referral in the six-month follow-up period.

We note that on an annual statewide basis, the top 0.1 percent risk threshold would identify about 2,000 unique individuals for intervention, while the top 0.01 percent risk threshold would identify about 300 unique individuals for intervention.

TABLE 1.
Assessing Predictive Accuracy in the Validation Sample
 Validation Sample: First 10 Months of Calendar Year 2017

Predictive Accuracy in the Validation Sample by Decile		
Risk Score Decile	Observations	% With Forensic Evaluation in next 6 months
1	760,910	0.01%
2	566,565	0.03%
3	1,550,852	0.02%
4	587,933	0.01%
5	679,674	0.05%
6	980,712	0.04%
7	336,197	0.06%
8	1,128,577	0.05%
9	964,303	0.10%
10	827,865	0.85%

Predictive Accuracy in the Highest-Risk Quantiles		
Risk Score Quantiles	Observations	% With Forensic Evaluation in next 6 months
Top 1%	83,787	5.1%
Top 0.1%	8,383	20.6%
Top 0.01%	838	40.1%

Given that efficient intervention targeting would likely require focusing on the extreme high end of the risk distribution, the descriptive analyses that follow focus on persons in the top 0.1 percent and 0.01 percent of the 2017 validation sample. From Figures 6 through 12 we draw the following conclusions:

- The vast majority of both the top 0.1 percent and top 0.01 percent target populations experience one or more of the adverse outcomes charted in Figure

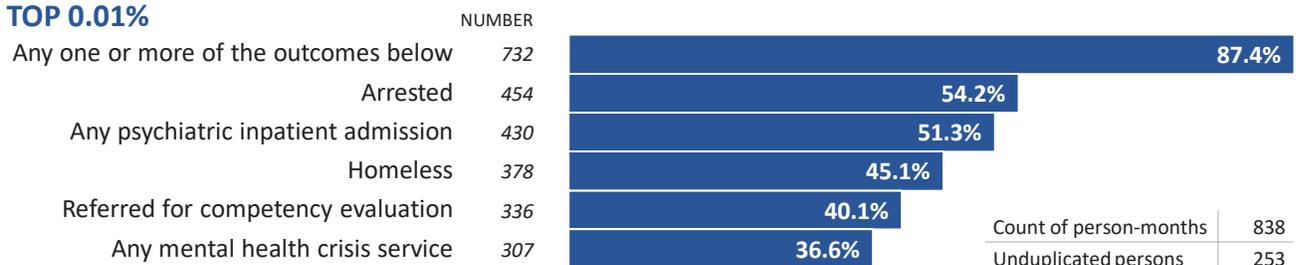
6. In particular we note that a significant proportion of each high-risk group experienced an arrest or a psychiatric hospitalization within the next 6 months.³

- The highest risk groups identified by the risk model are disproportionately minority (Figure 7).
- Most high-risk Medicaid enrollees are men (Figure 8).
- A large minority of each high-risk group experiences homelessness (Figure 9).
- Most high-risk group members are enrolled in “New Adult” Medicaid coverage, which means that Medicaid-funded interventions would have a relatively high federal fund share (Figure 10).
- Most high-risk group members are enrolled in managed care (Figure 11).
- A disproportionate share of the high-risk groups live in King County (Figure 12).

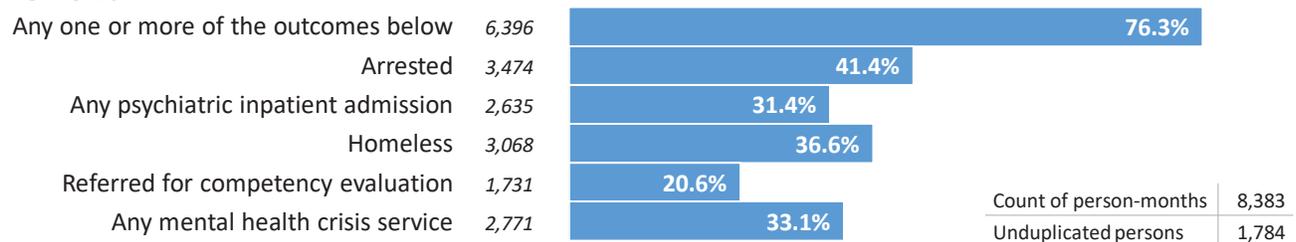
FIGURE 6.
Outcomes

Forensic Predictive Modeling Results: 10 Month Validation Sample

TOP 0.01%



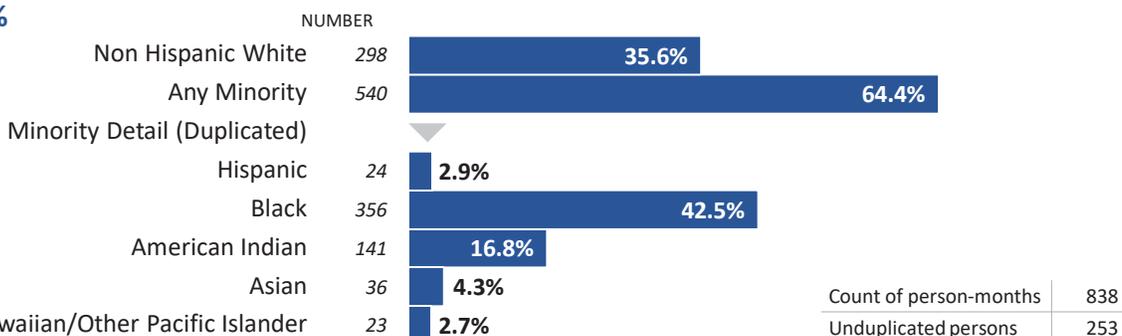
TOP 0.1%



³ Mortality rates were very low in the high-risk groups (approximately 0.5 percent in each group), and are not presented in Figure 6.

FIGURE 7.
Race/Ethnicity Distribution
 Forensic Predictive Modeling Results

TOP 0.01%



TOP 0.1%

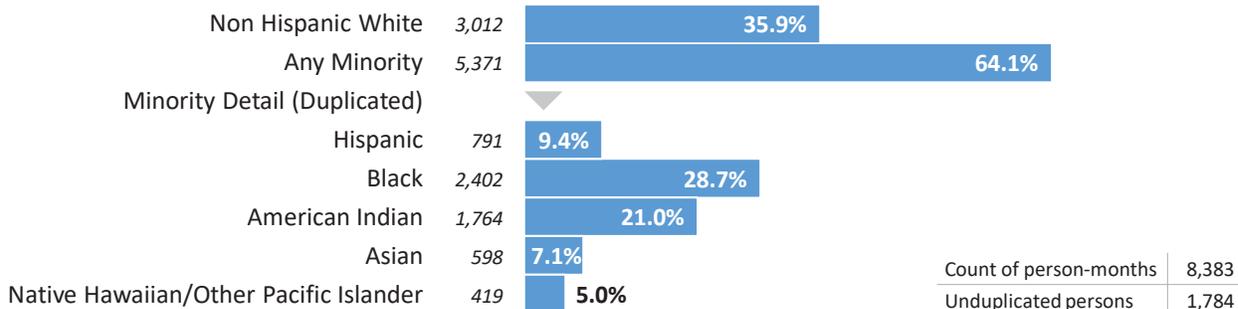


FIGURE 8.
Gender Distribution
 Forensic Predictive Modeling Results

TOP 0.01%



TOP 0.1%



FIGURE 9.
Housing Status as of Index Month
 Forensic Predictive Modeling Results

TOP 0.01%



TOP 0.1%

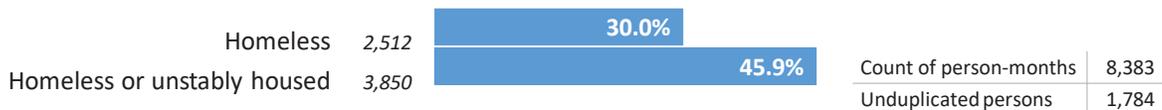
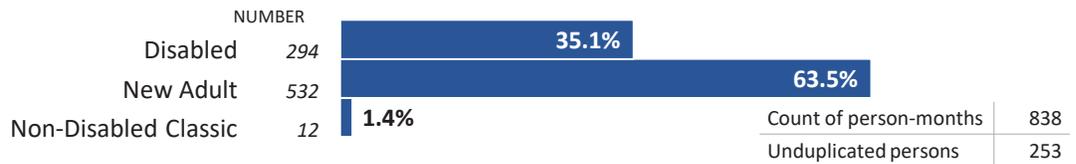


FIGURE 10.
Medicaid Coverage Group Distribution
 Forensic Predictive Modeling Results

TOP 0.01%

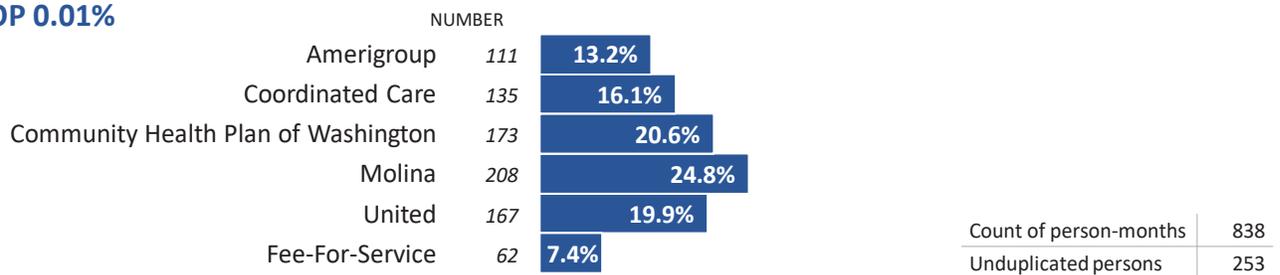


TOP 0.1%



FIGURE 11.
Managed Care Plan Distribution
 Forensic Predictive Modeling Results

TOP 0.01%



TOP 0.1%

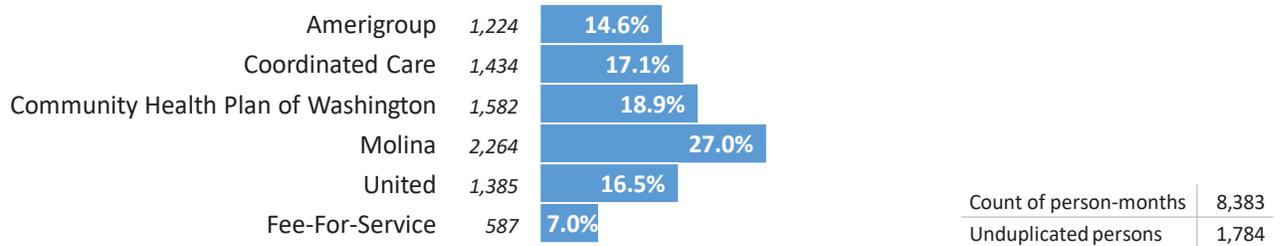
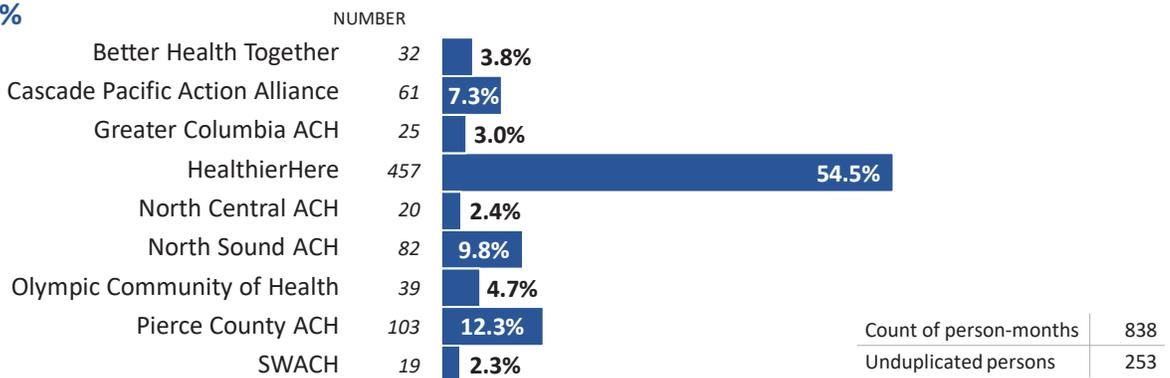
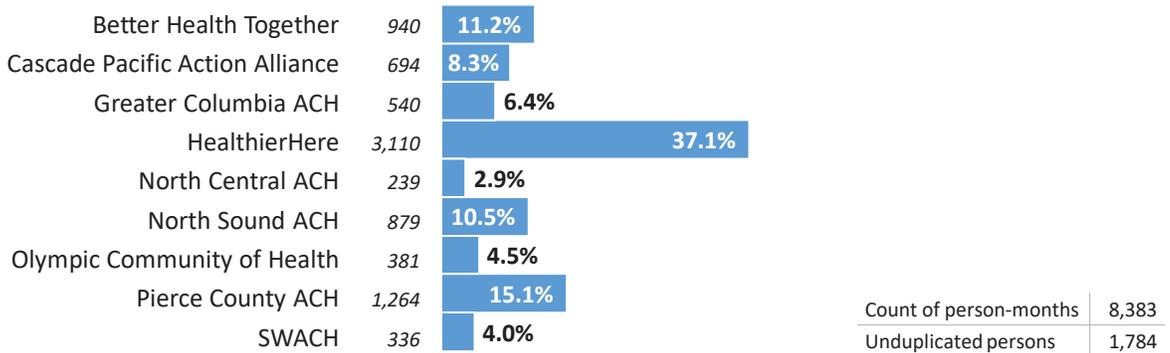


FIGURE 12.
Accountable Community of Health (ACH) Region Distribution
 Forensic Predictive Modeling Results

TOP 0.01%



TOP 0.1%



Discussion

We have shown that most persons who are arrested in Washington State are currently (or were recently) enrolled in Medicaid, and have mental illness and/or substance use disorders identified in their Medicaid-paid health service experience. It is technically feasible to provide regularly updated Medicaid member-level data to MCOs and BHOs that would identify their currently enrolled members who are at highest risk of being arrested and referred for a competency evaluation in the near future. The risk factors contained in the predictive model described in the appendix (including incarceration and forensic evaluation data) reflect information that would be legally permissible to share with MCOs and BHOs for their currently enrolled members.

Prior experiences in the forensic mental health system are by far the most information in predicting risk of a future competency evaluation referral. Rapid-cycle linkage of managed care enrollment with data from the recently implemented Forensic Data System (FDS) offers the most timely prospect for identifying enrolled Medicaid beneficiaries who are at high risk of a competency evaluation referral. The DSHS Research and Data Analysis Division is developing processes to link FDS data with ProviderOne managed care enrollment data. It is reasonable to expect that a mechanism for regularly sharing the results of that linkage with MCOs and BHOs for

their currently enrolled members could be in production by July 2019. This timeline assumes that progress continues to be made to improve FDS identifier quality.

We found that about half of the Medicaid beneficiaries with the highest risk of future involvement in the forensic mental health system are homeless or unstably housed. An even larger proportion (about 90 percent) have a substance use disorder. Based on this profile, we would expect the high-risk population to be challenging to find and engage in services. We note that from a client-finding perspective, MCOs and BHOs have access to their internal encounter data and case management systems, and the state-operated PRISM application, which provide them with information about primary care providers and other current treating providers (to the extent the identified high-risk member has recently received care). Leveraging this information may be an avenue to more current means of contact for some high-risk, unstably housed members.

Other important attributes of the high-risk population include:

- A high proportion are from minority groups, reflecting racial disproportionality in the criminal justice system;
- A high proportion reside in urban counties;
- High-risk Medicaid enrollees are likely to experience other adverse outcomes including arrest or psychiatric hospitalization;
- Some high-risk Medicaid enrollees have significant physical comorbidities, and about 30 percent would meet PRISM risk score criteria for eligibility for the Health Home program;
- A high proportion are enrolled in Medicaid Expansion coverage, presenting favorable intervention financing opportunities due to the higher federal match available for services covered under Medicaid.

Taken together, these attributes point to targeted interventions designed to engage a diverse, complex population with significant rates of homelessness, substance use disorder, and physical condition comorbidities.

We conclude with a discussion of intervention strategies that may be effective in reducing future criminal justice involvement by high-risk Medicaid enrollees. We note that the effectiveness of these strategies is dependent on factors such as:

- Developing intervention financing and implementation strategies, including strategies for persons who are not enrolled in Medicaid;
- Supporting the readiness of managed care organizations to receive data identifying high-risk Medicaid beneficiaries currently enrolled with them; and
- Building additional capacity in community mental health and SUD treatment delivery systems to provide intensive services and supports for high-risk populations.

With regard to specific potential intervention strategies, we begin with consideration of the Assertive Community Treatment program (also known as the Program of Assertive Community Treatment, or PACT). PACT is a model of community care intended for

persons who experience severe and persistent symptoms of mental illness (e.g., repeated hospitalization). PACT provides a comprehensive range of services from a treatment team typically consisting of a medication prescriber, case manager, mental health professional, peer specialist, and team leader. Supported employment and vocational rehabilitation are also an aspect of PACT.

PACT has been evaluated in a large number of randomized trials, and results suggest it is effective in reducing hospitalizations, costs no more than care-as-usual, and is more satisfactory to consumers and their families (Boust, Kuhns, & Studer, 2005 in Stout and Hayes, Eds.). Although scoring poorly from a benefit/cost model perspective, the Washington State Institute for Public Policy (WSIPP) found PACT is effective in reducing homelessness and psychiatric hospitalizations. WSIPP benefit-cost analyses have also found employment counseling and job training services (in the context of transitional reentry from incarceration into the community) are effective at increasing earnings, reducing technical violations of conditional release, and are cost-effective.

Our forensic risk model found both homelessness and prior psychiatric hospitalizations to be predictors of future competency evaluation referrals. Given that the PACT model has been shown to reduce rates of homelessness and psychiatric hospitalization, there is evidence to suggest it could reduce the risk of referral for competency evaluation. While Washington State currently has a PACT program for adults with serious mental illness, wider targeted implementation of this program may lessen the number of competency evaluation referrals and help Medicaid beneficiaries avoid involvement in the forensic mental health system.

While research indicates the PACT model is effective in reducing patient rehospitalization and in increasing stable housing (Baronet & Gerber, 1998; Bedell, Cohen, & Sullivan, 2000; Bond et al., 2001; Gorey et al., 1998; Herdelin & Scott, 1999; Latimer, 1999; Marshall & Creed, 2000; Ziguras & Stuart, 2000), some have argued the PACT model can be strengthened by incorporating recovery-focused clinical interventions, such as Illness Management and Recovery (IMR; Gingreich & Muser, 2005) into the PACT model. IMR is an evidenced-based intervention designed to improve consumers' self-management of their mental illness (McGuire et al., 2013). IMR includes psychoeducation (i.e., teaching consumers about mental illness and treatment), cognitive-behavioral therapy (see below), and motivational interviewing (i.e., technique to increase consumers' motivation to participate in treatment (McGuire et al., 2016; Salyers et al., 2009). Consumers are considered to be active members of their treatment team and are encouraged to make their own informed choices (Gingreich and Muser, 2005). A recovery orientation is adopted, in which treatment team members help consumers reestablish their sense of self, find their place in society, and reach their full potential (McGuire et al., 2016).

Evidence suggests IMR can be successfully incorporated into the PACT model (Salyers et al., 2009, 2010). For example, Salyers et al. (2009) found IMR was successfully integrated into PACT teams at six of seven studied sites, and five sites achieved high fidelity scores (i.e., full integration of IMR into PACT model) within one year. In addition, consumers demonstrated significant positive changes in their illness management skills and sense of hope. A meta-analysis completed by WSIPP (2017) found IMR had a

positive benefit/cost ratio. As consumers' improved self-management of their mental illness could reduce the risk of psychiatric decompensation and hospital readmission, integration of IMR in the PACT model may indirectly reduce competency referrals, as both psychotic symptoms and psychiatric hospitalization are predictive of competency referrals.

Cognitive-behavioral therapy for psychosis (CBTp) may also indirectly decrease Washington's competency referrals. Cognitive-behavioral therapy for psychosis (CBTp) is an evidence-based treatment designed to target psychotic symptoms (e.g., hallucinations, delusions) that persist despite treatment with antipsychotic medications (Velligan, 2009). It involves the use of cognitive techniques to change consumers' maladaptive thoughts, feelings, and behaviors, as well as behavioral strategies to target their negative symptoms (e.g., reduced emotional expression; social withdrawal). Consumers are taught coping strategies, problem-solving skills, social skills, and relapse prevention strategies. Multiple meta-analyses indicate CBTp is effective in reducing psychotic symptoms, as well as improving consumers' quality of life, self-esteem, and coping strategies (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Sarin, Wallin, & Widerlöv, 2011; Turner, van der Gaag, Karyotaki, & Cuijpers, 2014; Wykes, Steel, Everitt, & Tarrier, 2008). A meta-analysis completed by the Washington State Institute for Public Policy (2017) found CBTp had a positive benefit/cost ratio.

However, as many consumers in the community do not have access to mental health providers with training in CBTp, attention has been devoted to the delivery of low-intensity, or brief, CBTp (Bennett-Levy et al., 2010). In brief CBTp, non-therapist providers are taught a simplified version of CBTp so they can incorporate CBTp therapeutic techniques into their work with patients without going outside their scope of practice. For example, psychiatrists could include these strategies with patients during medication management sessions or case managers could incorporate them into their regularly scheduled client interactions (Montesano et al., 2014).

Studies on the efficacy of brief CBTp generally found the incorporation of CBTp into treatment resulted in significant improvements in patients' psychotic symptoms, depressive symptoms, social functioning, overall quality of life, and insight into their mental illness (Nareem et al., 2016; Turkington et al., 2002, 2014; Waller et al., 2013). In addition, both Nareem et al. (2016) and Waller et al. (2016) found the moderate effects (i.e., strength of the relationship) observed were maintained after patients completed brief CBTp treatment.

Similar to IMR, the incorporation of brief CBTp into PACT may be beneficial to both patients and treatment providers. As case managers tend to spend more time with patients than other mental health professionals in community mental health clinics (Sivec et al., 2017), incorporating brief CBTp into Washington's PACT program would make a potentially efficacious treatment more accessible to patients (Bond & Dryden, 2005). In addition, this would be cost-effective for community programs, as fewer doctorate-level psychologists would need to be employed to provide individualized treatment for active mental health symptom (Sivec et al., 2017). As psychotic symptoms predict inpatient hospitalizations and inpatient hospitalizations predict competency

referrals (Beard et al., 2016; Sfetcu et al., 2017), the integration of brief CBTp and PACT may indirectly reduce the number of Washington's competency referrals.

Finally, there may be ways to reduce the number of competency referrals in Washington that do not involve psychiatric interventions. For example, although there is no known data on the number of cases referred for forensic evaluation at arraignment, anecdotal evidence suggests the number is quite high in certain jurisdictions. Many defendants may be under the influence of mind-altering substances at the time of arrest. Their behavior and cognition may continue to be affected at the time of arraignment, resulting in a referral for a competency evaluation. However, these behavioral and cognitive effects may abate once the defendant is no longer under the influence of substances, at which time the competency evaluation may no longer be deemed necessary. Deferring competency evaluation requests until the defendant has had time to undergo managed withdrawal (while considering defendants' rights to due process) might reduce some potentially avoidable competency evaluation referrals.

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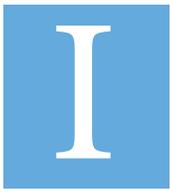
APPENDIX TABLE 1.
Final Model Parameter Estimates and Odds Ratios
 Model Calibration Data: Calendar Year 2015 – Calendar Year 2016

Variable	Coefficient	Odds Ratio Estimate
Intercept	-7.0944	
Age 25 – 29, relative to Age 18 - 24	0.0906	1.095
Age 40 – 44, relative to Age 18 – 24	-0.1193	0.888
Age 45 – 49, relative to Age 18 – 24	-0.1772	0.838
Age 50 – 54, relative to Age 18 – 24	-0.3186	0.727
Age 55 – 59, relative to Age 18 – 24	-0.4478	0.639
Age 60 – 64, relative to Age 18 – 24	-0.6550	0.519
Female, relative to Male	-0.8981	0.407
Black	0.4428	1.557
American Indian	0.4905	1.633
In DOC facility, prior 7 to 12 months	0.3323	1.394
In DOC facility, prior 13 to 24 months	0.2292	1.258
In DOC facility, prior 25 to 36 months	0.2673	1.306
In DOC facility, prior 37 to 60 months	0.6374	1.892
Forensic State Hospital admit, prior 4-6 months	0.7290	2.073
Forensic State Hospital admit, prior 7-12 months	0.7076	2.029
Forensic State Hospital admit, prior 25-36 months	0.9061	2.475
Forensic State Hospital admit, prior 37-60 months	0.7904	2.204
Civil State Hospital admit, prior month	-1.1683	0.311
Com. Psych admit, 1 month prior	0.8756	2.400
Com. Psych admit, 2 months prior	0.7053	2.024
Com. Psych admit, 3 months prior	0.5617	1.754
Com. Psych admit, 4-6 months prior	0.6663	1.947
Com. Psych admit, 7-12 months prior	0.7887	2.201
Com. Psych admit, 13-24 months prior	0.7437	2.104
Com. Psych admit, 25-36 months prior	0.5836	1.793
Com. Psych admit, 37-60 month prior	0.6003	1.823
E&T admit, 1 month prior	0.6797	1.973
E&T admit, 2 months prior	0.6174	1.854
E&T admit, 4-6 months prior	0.5205	1.683
E&T admit, 7-12 months prior	0.9505	2.587
E&T admit, 13-24 months prior	0.6787	1.971
E&T admit, 25-36 month prior	0.8907	2.437
E&T admit, 37-60 month prior	0.3240	1.383
Forensic State Hospital discharge, 13-24 months prior	0.5755	1.778
Forensic State Hospital discharge, 25-36 months prior	0.5733	1.774
Civil State Hospital discharge, 1 month prior	0.7664	2.152
Civil State Hospital discharge, 4-6 months prior	0.5704	1.769
Civil State Hospital discharge, 7-12 months prior	0.8159	2.261

Civil State Hospital discharge, 13-24 months prior	0.3260	1.385
Civil State Hospital discharge, 37-60 month prior	0.5662	1.762
Homeless without housing, 1 month prior	0.5611	1.753
Homeless without housing, 7-12 months prior	0.2494	1.283
Homeless without housing, 25-36 months prior	0.2533	1.288
Homeless with housing, 1 month prior	0.8785	2.407
Homeless with housing, 7-12 months prior	0.1731	1.189
Homeless with housing, 13-24 months prior	0.2973	1.346
Homeless with housing, 37-60 months prior	0.2593	1.296
Competency evaluation referral, 1 month prior	3.2568	25.967
Competency evaluation referral, 2 months prior	1.7282	5.630
Competency evaluation referral, 3 months prior	1.5506	4.714
Competency evaluation referral, 4-6 months prior	1.8563	6.400
Competency evaluation referral, 7-12 months prior	1.6106	5.006
Competency evaluation referral, 13-24 months prior	1.8805	6.557
Found not competent, 1 month prior	-1.1486	0.317
Found not competent, 13-24 months prior	-0.2655	0.767
Other competency evaluation disposition, 2 months prior	0.9482	2.581
Other competency evaluation disposition, 3 months prior	0.8289	2.291
Other competency evaluation disposition, 7-12 months prior	0.2854	1.330



DSHS will contact Department of Archeology and Historic Preservation and obtain Executive 05-05 conformance once the final site selection has been established for the project.



BEHAVIORAL HEALTH BUILDINGS

ENERGY LIFE CYCLE COST ANALYSIS

Department Social Health Services

January 2020

BCE Engineers, Inc.
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Tacoma, Washington 98424
(253) 922-0446

BEHAVIORAL HEALTH

Energy Life Cycle Cost Analysis

1.0 EXECUTIVE SUMMARY

This Energy Life Cycle Cost Analysis (ELCCA) is an effort to document, plan, and make decisions regarding the energy-related components of this facility. The energy analyst and architectural team have listed, discussed, and analyzed the envelope for this building. They have made decisions and assumptions about the roof, walls, floor, glazing and doors, and how these interact with the heating, ventilation, and air conditioning (HVAC) system, and lighting systems. Decisions were made about the practicality, budget, and function of these items and the components chosen best fit this facility and its constraints.

Three different building design options were examined using the eQuest 3.65.7175 / DOE-2.3 energy simulation computer program. All options meet the constraints of the ELCCA Guidelines and this analysis offers a conclusion of the best of these systems.

This analysis concentrates on the HVAC and energy source options. The prescriptive guidelines and the proposed systems are described in their respective sections of this report.

1.1 Envelope Analysis

The recommended new building wall envelope consists of 2" x 6" wood stud walls at 16" o.c. with R-21 batt, vapor barrier and gypsum board. The new roof has R-38 rigid above deck. All glazing will be double-pane in metal frames with at least $U=0.38$ and $SHGC=0.4$ per WSEC. The building envelope is discussed in Section 3.0

1.2 HVAC Analysis and Recommendations

Alternative #1 uses a Variable Refrigerant Flow system to control temperature in the building zones except for IT closets which have small, independent DX cooling units. Ventilation air is provided by dedicated outside air variable volume air handling unit with an enthalpy wheel. Alternative #2 uses a ground-coupled water source heat pump system. Individual heat pumps serve each zone. A DOA with a heat exchanger provides ventilation air. Alternative #3 uses the same Variable Refrigerant Flow system as Alternate #1 and includes a roof mounted PV system. The WSEC baseline model utilizes cycling two stage heat pump units and a heat recovery DOA.

1.2.1 System Type Recommendation

The modeled building designs were discussed with the district and the design team, and the Variable Refrigerant Flow system with DOA analyzed in Alternative #1 was determined to be the system of choice and is recommended for the facility. The proposed energy model shows an overall energy savings of 9.9% when compared to the WSEC baseline energy model. All proposed energy model building area envelope values comply with current WSEC code. Alternative #1 has the lowest 50 year life cycle cost. See the HVAC System Discussion in Section 4.0 for more information about this system.

**BEHAVIORAL HEALTH
Energy Life Cycle Cost Analysis**

1.3 Lighting System Description

The interior lighting density values used for the baseline energy model is 0.66 watts/square foot. The value was obtained from the WSEC, Table C405.4.2(1) Office. The proposed interior lighting value is assumed to be 0.59 watts/square foot, a 10% reduction.

1.4 Domestic Hot Water Description

Values of typical occupancy and hot water usage were determined using DOE-2.3 standard values. DHW heaters are modeled as electric heaters for all energy models.

1.5 Estimated Annual Costs for Systems

The estimated annual cost for the recommended Variable Refrigerant Flow system includes total building energy use and maintenance. The estimated building energy consumption is obtained from the eQuest 3.657175 / DOE-2.3 energy cost output. The annual maintenance cost is estimated from 2015 RS Means Facilities Maintenance and Repair and Cost Data and RS Means Mechanical cost data 2017.

Table 1-1 Summary of Costs per Building

System Alternative	First Costs	Annual Electric Fuel Costs	Annual Maintenance Costs	Total Life Cycle Costs	Energy Usage Index (KBTU /s.f.-yr.)
Variable Refrigerant Flow, DOA, Electric DHW	\$399,305	\$15,920	\$6,279	\$1,466,218	30.2
Ground Loop Heat Pumps, DOA, Gas Boiler, Electric DHW	\$699,000	\$15,652	\$15,162	\$2,075,408	29.5
Variable Refrigerant Flow, DOA, Electric DHW, PV System	\$451,805	\$11,602	\$6,944	\$1,477,685	22.0
WSEC Cycling Heat Pump with DOA, Electric DHW					33.5

BEHAVIORAL HEALTH

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2.0 PROJECT DESCRIPTION

2.1 Construction Project

The three Behavior Health Buildings will be new buildings located in Clark County, Washington. Building areas include bedrooms, commons, kitchen, and offices. The total building floor area for each building is approximately 17,000 sq ft. There are no exceptional shading systems, or special considerations for this project. The buildings will be occupied during the day, primarily between the hours of 6 am and 11 pm. There is night occupancy that is assumed to be minimal.

2.2 Summary of Utility Assistance

Puget Sound Energy supplies electrical power. Puget Sound Energy does offer energy conservation measures. However energy conservation measure need to preapproved by Puget Sound Energy prior to construction. Contact Puget Sound Energy at 1-888-225-5773 for more information.

3.0 BUILDING DESCRIPTION

3.1 Building Components

3.1.1 Envelope

The new wall and roof will meet current WSEC envelope new construction requirements. The baseline and proposed energy model building envelopes meet the WSEC prescriptive values shown in Table 3-1. Table 3-1 also compares the prescriptive baseline building components to the proposed building components.

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Energy Life Cycle Cost Analysis

Table 3-1
Prescriptive vs. Proposed Building Components

Component	Prescriptive	Proposed	Result
Roof	R-38 rigid, U=0.027 (WSEC 2015 prescriptive Roof)	R-38 rigid or R-49 batt attic type, U = 0.027	Meets Prescriptive
Walls	U=0.055 maximum (Steel Frame) (WSEC 2015 Prescriptive) U=0.054	2x6 wood stud, R-21 batt, U=0.054 U=0.054	Meets Prescriptive
Glazing	Windows, U=0.38, SHGC=0.4 (WSEC 2015 prescriptive Window)	U=0.38, SHGC=0.4	Meets Prescriptive
Doors	Metal U=0.37	Metal U=0.37	Meets Prescriptive
Crawl space	R-30 Rigid insulation	R-30 Rigid insulation	Meets Prescriptive

3.2 Energy Simulation Assumptions

For this analysis, the building was divided into 28 zones that group together spaces of similar heating and cooling loads within the building.

The computer program used for energy simulation is eQuest 3.657517 / DOE-2.3 provided by the state of California and the federal government.

The building occupancy schedule is 6:00 a.m. to 11:00 p.m. at nearly full occupancy. There is minimal occupancy at night. The heating and ventilation schedule follows the occupancy schedule, with the heating and ventilation system starting up approximately one hour before building occupancy and shutting down approximately one hour after the end of the occupied day.

Heating set point is 70°F, and cooling set point is 76°F. During unoccupied/minimal occupancy hours, the HVAC system reverts to a "setback" mode and the heating set point drops to 66°F; the cooling "setback" temperature is 76°F.

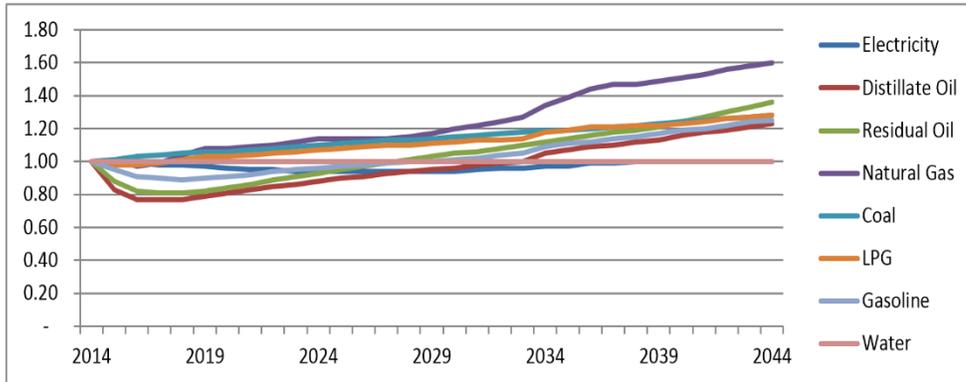
3.3 Economic Assumptions

The economic assumptions made in this analysis are based on the ELCCA Guidelines published by the Washington State Energy Office. The data used to produce the graph below is from the ELCCAT spreadsheet available from the Washington state department of enterprise services. "Real" escalation rates for various fuel types are as shown in Figure 3-1 below.

BEHAVIORAL HEALTH

Energy Life Cycle Cost Analysis

Figure 3-1
“Real” Escalation Rates



"Real" analysis does not account for general inflation.

3.4 Utility Rates

The electric rate used for the economic analysis is Puget Sound Energy Electric Schedule 31. The electric energy charge is \$0.0617 per kWh, the demand charges are \$9.77 per kW, and the basic monthly charge is \$353.17. See the rate schedules on the following pages.

BEHAVIORAL HEALTH Energy Life Cycle Cost Analysis



Electric Summary Sheet No. S-10
Effective Date 1/1/2018

SUMMARY OF TOTAL CURRENT PRICES - ELECTRIC Commercial, Industrial and Lighting Schedules

Rates in this summary include the effect of all supplemental rate schedules except Schedule 81, Municipal Tax Adjustment, where applicable. In case of discrepancy between data below and the rate schedules, the latter have precedence. All rates shown are subject to adjustment by such other schedules in the company's tariff as may apply.

PRIMARY GENERAL SERVICE

SCH 31 & 10*

For commercial or industrial customers with delivery at primary voltage (600 volts or higher). Customer provides all transformation and facilities beyond the point of delivery. * Schedule 10 * (Residential & Farm Primary General Service)

Shown on Billing Statement		OCT - MAR	APR - SEP		12/19/2017
BASIC CHARGE	\$	353.17	Per Month	SCH 31 & 10	Effective
EXPEDITED RATE FILING ADJ	\$	-	Per Month	SCH 141	Effective
TOTAL BASIC CHARGE	\$	353.17	Per Month		12/19/2017

Shown on Billing Statement		OCT - MAR	APR - SEP		12/19/2017
DEMAND CHARGE	\$	11.76	Per kW	SCH 31 & 10	Effective
EXPEDITED RATE ADJ	\$	-	Per kW	SCH 141	Effective
REVENUE DECOUPLING ADJ MECHANISM (Surcharge)	\$	(0.04)	Per kW	SCH 142	Effective
TOTAL DEMAND CHARGE	\$	11.74	Per kW		12/19/2017

Shown on Billing Statement		OCT - MAR	APR - SEP		12/19/2017
ENERGY CHARGE	\$	0.056535	Per kWh	SCH 31 & 10	Effective
LOW INCOME PROGRAM	\$	0.000696	Per kWh	SCH 129	Effective
PROPERTY TAX TRACKER	\$	0.002188	Per kWh	SCH 140	Effective
EXPEDITED RATE FILING RATE ADJ	\$	-	Per kWh	SCH 141	Effective
REVENUE DECOUPLING ADJ MECHANISM (Surcharge)	\$	-	Per kWh	SCH 142	Effective
TOTAL ENERGY CHARGE	\$	0.059429	Per kWh		12/19/2017

Shown on Billing Statement		OCT - MAR	APR - SEP		12/19/2017
POWER COST ADJUSTMENT CLAUSE	\$	-	Per kWh	SCH 95	Effective
FEDERAL WIND POWER CREDIT	\$	(0.002065)	Per kWh	SCH 95A	Effective
ELECTRIC CONS. PROGRAM CHARGE	\$	0.004552	Per kWh	SCH 120	Effective
MERGER CREDIT	\$	(0.000238)	Per kWh	SCH 132	Effective
RENEWABLE ENERGY CREDIT	\$	(0.000028)	Per kWh	SCH 137	Effective
TOTAL PER KWH	\$	0.061710	Per kWh		12/19/2017

Shown on Billing Statement		OCT - MAR	APR - SEP		12/19/2017
REACTIVE POWER CHARGE	\$	0.001100	Per KVARH	SCH 31	Effective
EXPEDITED RATE FILING ADJ	\$	-	Per KVARH	SCH 141	Effective
TOTAL REACTIVE POWER CHARGE	\$	0.001100	Per KVARH		12/19/2017

BEHAVIORAL HEALTH
Energy Life Cycle Cost Analysis

4.0 HVAC SYSTEMS

4.1 HVAC Costs

Three HVAC building designs were analyzed using the ELCCA spreadsheet calculations. Table 4-1 summarizes the costs that were estimated and used in the spreadsheets.

Table 4-1
Detailed Breakdown of Life Cycle Costs

Category	Variable Refrigerant Flow system	GLHP System	Variable Refrigerant Flow system with PV
HVAC	\$399,305	\$699,000	\$451,805
Materials	\$170,357	\$241,675	\$196,607
Labor	\$228,948	\$456,837	\$228,948
Annual Maintenance	\$6,279	\$15,162	\$6,944
Controls	\$237	\$237	\$237
Maintenance of Units (filter, belt, clean coils)	\$6,042	\$12,890	\$6,042
Pumps		\$260	
Boiler		\$1775	
PV Array			\$665
Replacement Costs @ 50yr	\$656,800	\$932,740	\$796,928
Total First Year Energy Cost	\$15,920	\$15,652	\$11,602
Total 50 yr. LCC	\$1,466,218	\$2,075,408	\$1,477,685

A detailed breakdown of the replacement costs is shown in Table 4-2. The replacement years are obtained from the ELCCA Guidelines for Public Agencies (January 2016) unless otherwise discussed in this report. The PV system maintenance and replacement years were obtained from US Solar Photovoltaic System Cost Benchmark report. The detailed breakdown of replacement costs shown in table 4-2 are present value costs.

**BEHAVIORAL HEALTH
Energy Life Cycle Cost Analysis**

**Table 4-2
Detailed Breakdown of Replacement Costs per Building**

Equipment Type	Replacement (Years)	Cost (\$)
Variable Refrigerant Flow system (Alt. 1- Proposed)		
DOA with HX	20	\$ 24,700
Variable Refrigerant Flow Units	19	\$108,780
Controls	15	\$ 62,000
Ground Loop Heat Pump (Alt. 2)		
DOA with HX	20	\$ 24,700
Ground Loop Heat Pumps	19	\$ 78,400
Pumps	20	\$ 7,900
Boiler	25	\$ 4,675
Controls	15	\$ 62,000
Variable Refrigerant Flow system and PV (Alt. 3)		
DOA with HX	20	\$ 24,700
Variable Refrigerant Flow Units	19	\$108,780
Controls	15	\$ 62,000
PV System	15	\$ 52,500

4.2 HVAC System Descriptions

Three systems were analyzed for this project.

4.2.1 Variable Refrigerant Flow System (Alternative #1-Proposed)

This system uses Variable Refrigerant Flow units to control temperature in the building zones except for IT closets which have small, independent DX cooling units. Multiple separate VRF indoor units are piped to at least 2 separate outdoor units. Building ventilation is provided by a variable volume DOA unit with heat exchanger that runs continuously during occupied hours. All new equipment meets the WSEC energy efficiency requirements.

This alternative system is recommended for DSHS Behavior Health Building. The actual first cost estimate is given in Table 4-1 above.

BEHAVIORAL HEALTH Energy Life Cycle Cost Analysis

4.2.2 Ground Source Heat Pump System (Alternative #2)

This system uses dual compressor/dual fan speed Ground Source Heat Pump units to serve all zones. Heat pumps operate intermittently during occupied hours. Building ventilation is provided by a constant volume DOA unit with heat exchanger that runs continuously during occupied hours. The condenser water is provided by a ground loop hydronic system. This system rejects or obtains heat through the ground loop piping system. Ground source heat pumps have a very high coefficient of performance due to the relatively constant and mild temperature of the earth at depths greater than twenty feet. All equipment meets the WSEC energy efficiency requirements.

This alternative system is not recommended for DSHS Behavior Health Building. The first cost estimate is given in Table 4-1 above. The life cycle summary is also given in Table 4-1.

4.2.3 Variable Refrigerant Flow with PV System (Alternative #3)

This system uses that same Variable Refrigerant Flow system described in Section 6.2.1. This building design also includes a roof top 35 kW PV system comprised of a 2,400 square foot standard, fixed, open rack solar array with a 14% system loss.

This alternative system is not recommended for DSHS Behavior Health Building. It is suggested that the building be designed with a pathway to the roof so that a PV system can be easily added at a later date. The actual first cost estimate is given in Table 4-1 above. The life cycle summary is also given in Table 4-1.

4.2.4 Cycling Heat pump units with Continuous DOA (WSEC Baseline)

This system uses dual compressor heat pumps for each zone and a dedicated outdoor air unit that provides ventilation to the entire building. The units cycle during occupied and unoccupied business hours to provide heating and cooling for each associated space. Ventilation air for each zone is provided by a dedicated outdoor air handling unit with an enthalpy wheel that runs continuously during occupied hours. All equipment meets the WSEC energy efficiency requirements.

See Table 1-1 for a comparison of WSEC compliant building energy consumption versus Alternative 1 through 3 building design energy consumption.