Renovation & Expansion of the Anacortes Readiness Center

Washington State Military Department

Project # 2020-077

PREDESIGN

September 15, 2020

SSW ARCHITECTS

SCHREIBER STARLING WHITEHEAD

ANACORTES
READINESS CENTER
RENOVATION & EXPANSION

PROJECT NO. 2020-077 (FEDERAL PROJECT NO. 53150098)

Predesign Study

September 15, 2020

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SECTION 1 – EXECUTIVE SUMMARY

A. PROBLEM STATEMENT

1. Critical mission and responsibilities

The Washington State Military Department is a unique state agency that also is a critical element of the U.S. military that serves both community and country. The WMD and the Army National Guard has provided properly trained and equipped units, available for prompt mobilization for war, national emergency, natural disasters, or as otherwise needed. The Army National Guard is a partner with the Active Army and the Army Reserves in fulfilling the country's military needs.

The unit housed in the Anacortes Readiness Center is A Company of the 3rd Infantry Battalion of the 161st Infantry Regiment of the 81st Stryker Brigade. Their Federal mission is to provide a trained unit capable of deployment in support of the U.S. Army. Their State mission is to be ready on order of the Governor, to support the civil agencies that have the primary responsibility to protect life and property, and preserve the peace, order, and public safety.

2. Aging and ineffective facilities

In recent years, concerns about the lack of adequate training and support space and the aging physical condition of the Anacortes Readiness Center have focused attention on the need for capital development to ensure the operational effectiveness of the assigned unit and personnel. In summary, the 57-year old Anacortes Readiness Center was observed to have the following deficiencies:

- Lack of training and classroom space
- Seismic weakness of the structure
- Lack of fire protection
- Poor energy efficiency
- Inadequate electrical systems
- Inadequate mechanical systems
- Poor functionality

3. Impact on mission accomplishment

a. Lack of space

The Anacortes Readiness Center (ARC) was constructed in 1963 with a total area of approximately 14,965 gross square feet (gsf). When originally constructed it supported approximately 42 assigned personnel. With consolidation of WMD facilities statewide, in 2012, the number of housed troops increased to 150. This increase of personnel was done with no increase in the facilities at the site except for the construction of two metal storage buildings.

Based upon established National Guard space standards, this facility is drastically undersized. Per national standards, a readiness center supporting 151 personnel is authorized a total of 37,198-gsf. With only 12,738-assigned square feet (asf), the ARC is one of the smallest facilities in the Washington National Guard inventory.

b. Lack of training space/facilities

In order to accommodate the administrative space needs of a unit that has increased in personnel by a

factor of 300% over its initially planned size, the spaces initially design as classrooms are currently have been converted to be used as offices by the command staff of the unit. The result is that there is little space left for the individual and small-unit education and training that is crucial for the unit to maintain its readiness and effectiveness.
Additionally, there is not capability to provide the technology-rich learning environment needed. The facility does not have the ability to support simulation-based training.

c. Lack of secure storage for critical equipment

The facility lacks space to properly store and secure organizational and individual equipment. To addresses this need, several un-heated Conex units have been placed on site as a temporary measure. This impacts the security of equipment, the ability to use the site effectively, and leaves equipment in un-conditioned space.

d. Weak seismic resilience

One of the most impactful natural disasters that could happen in the Anacortes area is a major seismic event. The existing building has significant weakness in its ability to sustain seismic damage. In a code-mandated seismic event, it is very likely that the building would sustain damage that would preclude its ability to support the disaster response mission of the Guard.

e. Poor accessibility

Typical of its age, the existing building is built in a "split-level" configuration. There is no access between the south wing of the building and the main ground floor. The interior restrooms also do not meet current accessibility impacting its availability to support community use.

f. Poor gender accommodation

The existing building was not planned for the inclusion of female soldiers. Even the Infantry is now open to females and the unit has assigned female troops. There is inadequate toilet and shower facilities for female soldiers.

B. OPPORTUNITY

This project will correct deficiencies in classrooms, teaching spaces, and instructional areas as well better security of the valuable and critical equipment assigned to the unit. A renovated and expanded ARC will meet the expanded collective training, administrative, automation, communication, and logistical requirements of the Alpha Company, 3BN-161 INF RGT of the Stryker Brigade Combat Team. It will also provide better family support to the unit and be a more effective recruitment/retention asset for the Guard.

The proposed project will provide a modern regional training center that meets the multi-level training and operational requirements for the assigned Army National Guard unit. It will be an efficient, technology-driven training facility that affords highly standardized and cost-effective training for the State Military Department. As a secondary function, the improved ARC would be available for community use and would function as an emergency response center and shelter.

C. ALTERNATIVES CONSIDERED

1. Do Nothing

No action will continue the status quo of the assigned units getting by with sub-standard facilities.

Advantages

- The option to do nothing does have the lowest first cost

Disadvantages

- Doing nothing will continue negative impact on the Unit's ability to provide effective training environment to their assigned personnel.
- Existing inadequate, inefficient, and cost-impacting conditions would continue.
- The poor seismic performance of the building will continue to be a risk to occupants and impact the ability to support disaster response to the local population.
- The haphazard feel of older and deteriorating building will continue to hamper personnel recruitment and retainage.

2. Renovate a portion of existing building and expand on the existing site

In this option, the WMD would develop a project to renovate approx. 6,000-gsf of the existing building to correct the most impacting of deficiencies impacting training and operations, and provide a 4,000-gsf addition that would provide the needed classroom/training spaces. The balance of the existing building would remain largely unchanged with only minor repair to existing finishes, a new roof system, and the addition of fire sprinklers.

Advantages

- Lowest first cost of all but the Do-Nothing Alternative-1.
- Provides the needed training/classroom spaces.
- Most of the building will meet current seismic and energy codes with fire safety improvements to all existing building.
- Maintains the existing metal storage buildings.
- Allows some occupancy of the balance of the Readiness Center during construction.
- Minimal impact on existing site.

Disadvantages

- Leaves 60% of the existing building largely un-improved. This would require a later project to address these issues.
- Requires some relocation of the existing operations during the construction phase.

3. Construct new Readiness Center on a portion of the existing site

In this option, the WMD would develop a two-phase project where the existing Readiness Center remains in operation while a new Readiness Center is constructed on another portion of the existing site. In this option, the two existing metal storage buildings are maintained. After occupying the new building, the

existing Readiness Center could be either demolished or sold to the City of Anacortes which has expressed interest in the building as a possible Community Center.

Advantages

- Provides all new operational and training space with purpose-designed environment.
- All of the building will meet current seismic and energy codes.
- Maintains the existing metal storage buildings.
- Provides potential for community benefit of repurposing existing building.

Disadvantages

- Higher first costs over Alternate-2 due to larger building size.
- Requires greater extent of site development/costs.
- More difficult to meet ATFP standards closer to the site perimeter.

4. Lease equivalent space on another site

In this option, the WMD would vacate the existing building and site and lease existing or purpose-developed facilities that could provide the needed space and function in the quantities permitted by the NGB space authorization.

Advantages

- 100% of authorized space would be provided
- The need for capital would be spread over 30-years

Disadvantages

- There is no suitable equivalent space in the locale requiring the agency to develop and lease option at higher initial costs.
- Highest Life-Cycle Cost of all alternatives

D. PREFERRED ALTERNATIVE

The proposed Alternative-2, which provides for renovation of 40% of the existing building and a 4,000-gsf expansion to provide the needed training and support spaces is the preferred alternative.

The following chart indicates the preferred alternative is the highest scoring when compared to desired criteria.

Alternative	*Adequacy of space supporting Unit training & readiness*	*Quality of operational environment*	*Flexibility for future program change*	*Flexibility for future growth on Site*	*Compliance with current codes*	*Impact to Recruiting and Retention*	*Maintenance/operations cost*	*Sustainability*	*First Cost*	*Life-Cycle Cost*	***TOTAL***
Alternative-1: Do nothing	1	1	1	1	1	1	1	1	5	2	**15**
Alternative-2: Renovate and expand existing	3	3	3	5	3	4	4	3	4	5	**37**
Alternative-3: Construction new on existing site	4	4	2	1	5	4	4	4	2	3	**33**
Alternative-4 Lease equivalent off-site space	3	3	1	1	4	3	4	3	2	1	**25**

E. PROJECT COST

The C-100 (Attachment 6.1) identifies the Total Project Costs for the preferred alternative project at $7,349,000 (escalated to mid-point of construction) broken down as follows:

Consultant Services	$ 1,541,000
Construction	$ 5,400,000
FF & E	$ 153,700
Artwork	$ 22,550
Other Costs	$ 231,750
TOTAL PROJECT	**$ 7,349,000**

SECTION 2 - PROBLEM STATEMENT

A. GENERAL

1. Problem Statement

Inadequate quality of needed space

The Anacortes Readiness Center (RC) was constructed in 1963 with a total assigned area of approximately 12,738 -asf. When originally constructed it supported approximately 42 assigned personnel. With consolidation of WMD facilities statewide, in 2012, the number of housed troops increased to 150. This increase of personnel was done with no increase in the facilities at the site except for the construction of two metal storage buildings. Based upon established National Guard space standards, this facility is drastically undersized. Per national standards, a readiness center supporting 151 personnel is authorized a total of 26,976 gross square feet (gsf). With only 12,738-asf, the ARC is one of the smallest facilities in the Washington National Guard inventory. The lack of critically needed space, particularly in training and classroom spaces has had a significant impact on the ability of the unit to meet its' readiness mission.

Poor quality/condition of existing building

After 57-years of service to the State, the ARC's aged building systems are failing, including the building envelope. The primary issues with the current building include:

- Lack of training and classroom space
- Seismic weakness of the structure
- Lack of fire protection
- Poor energy efficiency
- Inadequate electrical systems
- Inadequate mechanical systems
- Poor functionality

2. Project Opportunity

The renovation and expansion of the ARC is critical to the State of WA due to its current condition and space shortage, specifically for classroom, administrative space, women's latrine and lockers. As a result, the housed unit is not able to properly train and prepare for its State and Federal mission. The facility lacks space to properly store and secure organizational and individual equipment. It is not compliant with current ADA standards and codes and is inefficient with energy conservation standards resulting in increased utility and maintenance costs.

Modernization of the facility is required to support both the combat and combat support ability and to meet new requirements generated by the unit's transition from standard to mechanized infantry with the addition of Strykers.

The proposed renovation and expansion of the ARC offers several opportunities to improve mission success and create value for the State, the Military Department, and the community of Anacortes:

a. Improve the seismic performance of the building

This project provides the opportunity to address long-standing weakness in the seismic resistance systems of the building. While it's impossible to control the seismic hazards in our region, the most important factor in saving lives and reducing losses from an earthquake is to ensure that the first-responder buildings provide a measure of collapse resistance and can operate post-event to support people in need. Seismic upgrading this important structure is an opportunity to mitigate a substantial risk and upgrade the center to an essential facilities standard of seismic resistance.

b. Improve the energy performance of the building and contribute to reducing carbon emissions

In May of 2019, the state legislature passed a comprehensive clean energy bill, establishing some of the most ambitious environmental goals in the nation. Retrofitting old buildings and building new buildings that follow environmental design standards and focus on getting to Net-Zero energy use was noted as one of the fastest and least-costly way to cut carbon emissions.

WMD is committed to creating high performance facilities that will ensure the optimal health and productivity of occupants and buildings users. It is anticipated that the project will achieve certification to LEED Silver by the United States Green Building Council (USGBC) in accordance with Chapter 39.35d RCW "High Performance Public Buildings". The design will be a building that effectively conserves energy and water.

By providing a building envelope that has high thermal performance, coupled with new HVAC systems tied to a rooftop photovoltaic array, this project can be a demonstration of how the State can be a leader in energy conservation and carbon reduction. It can be is zero energy and zero carbon capable meeting the requirements of Executive Order 18-01. Specifically, the project will:

- Reduce energy consumption by targeting an Energy Use Index (EUI) of 30 which is at least a 20% reduction over the baseline.
- Include on-site renewable energy generation to offset of at least 7% of the building's energy need.
- Provide enhanced commissioning, measurement, and verification, to ensure the building is operating as efficiently as possible.
- Use materials and systems that promote a healthy indoor environment for WSDOT staff.

The WMD has an ambitious Greenhouse Gas (GHG) reduction goal of realizing a 15% reduction in GHG emissions below 2005 levels. To assist this goal, the proposed renovated and expanded ARC will be designed to meet at least six of the Best Practices to reduce greenhouse gas emissions, including:

- Above-code HVAC system efficiency
- On-site power generation
- Post occupancy commissioning
- Time-of-day and occupancy-programmed lighting
- Energy-efficient lighting
- Roofing materials with high solar reflectance and reliability

c. Increase effectiveness and productivity

By providing a work and training that is open, light, and engaging, the assigned personnel can be more productive. The lack of classrooms, dingy lighting, and colorless offices blocking daylight, all work together to create an environment that is uninspiring. By providing classrooms and offices that have adequate area and access to natural light, unit effectiveness will increase.

3. Program Response

This project will correct deficiencies in classrooms, teaching spaces, and instructional areas as well better security of the valuable and critical equipment assigned to the unit. A renovated and expanded ARC will meet the expanded collective training, administrative, automation, communication, and logistical requirements of the Alpha Company, 3BN-161 INF RGT of the Stryker Brigade Combat Team. It will also provide better family support to the unit and be a more effective recruitment/retention asset for the Guard.

The proposed project will provide a modern regional training center that meets the multi-level training and operational requirements for the assigned Army National Guard unit. It will be an efficient, technology-driven training facility that affords highly standardized and cost-effective training for the State Military Department. As a secondary function, the improved ARC would be available for community use and would function as an emergency response center and shelter.

B. PROJECT DRIVERS

1. Program Needs

The existing ARC suffers from inadequate operational and training space, aged infrastructure, and the inflexibility of the existing building to accommodate needed space without substantial renovation expansion. Specific programmatic needs include:

Classrooms/Training:
When originally constructed, the ARC supported approximately 42 assigned personnel. With consolidation of WMD facilities statewide in 2012, the number of housed troops increased to 151. This over 300% growth in housed personnel has been accommodated withing the existing building by converting spaces initially design as classrooms to be used as offices by the command staff of the unit. The result is that there is little or no space left for the individual and small-unit education and training that is crucial for the unit to maintain its readiness and effectiveness. Additionally, there is not capability to provide the technology-rich learning environment needed. The facility does not have the ability to support simulation-based training.

The National Guard Bureau (NGB) Space Standards (Appendix C) indicates that a unit of the size housed in the ARC should have 3,110-asf in classrooms and learning center spaces in addition to a multi-purpose training space of 1,500-asf. The existing building lacks any dedicated classroom space and has only 750-asf of multi-purpose training space which is available only because a locker room was converted to this use. This shortage of 3,860-sf in classroom and specialized training space is very impactful to unit readiness.

The NBG space authorization also includes dedicated storage areas for training aids and audiovisual equipment which are not provided in the current facility.

Administrative Space:
The original plans provided only 780-asf of administrative offices. While adequate for an occupancy of 40, this amount of office space is severely undersized for a unit with 151 assigned personnel. To address this shortage, 1,700-asf of classroom space has been converted to administrative offices. The National Guard Space Standards indicates that a unit of the sized housed in the ARC should have 4,260-asf in administrative offices space. The existing ARC contains only 2,500-asf of office space, a shortfall of 1,760-asf

Secure Storage:
A mechanized infantry unit such as the 3rd/162 INF has a lot of equipment and weapons serving both the individual solders as well as the unit itself. To provide security and conditioned space for this large volume of equipment, the NGB authorizes a total of 5,168-asf for unit and individual equipment storage. The existing ARC only has 1,080-sf of dedicated storage which is used exclusively for unit equipment and weapons. The locker room intended to house individual equipment storage has been converted to multi-purpose training. To accommodate this function, all individual equipment storage has been moved to a separate metal storage building on the site. Additionally, eight metal storage trailers and a prefabricated weapons trailer/vault have been placed in the military vehicle parking area to address some of the impact from the ARC having 4,088-sf short of the authorized space for equipment storage.

Personnel Support:
The existing building was never planned for the inclusion of female soldiers. Even the Infantry is now open to females and the unit has female troops assigned. There is inadequate toilet and shower facilities for female soldiers. Additionally, the NGB authorizes 330-asf space for lactation and family support. lactation,

Kitchen:
The ability to provide food for the assigned personnel on-site during their drill weekends is key to improving the access to and efficacy of their training time. Having a functional kitchen in a readiness center is also an important element in its role as a disaster response facility or shelter. The current ARC has a 200-sf kitchen vs. the 800-sf that is authorized by NGB standards.

2. Facility Needs

The ARC complex was designed and built in 1963. Other than minor functional changes and regular maintenance the building has not been upgraded or modified over the past 57-years. While well-maintained, the years of intensive use by has caused building finishes to suffer considerable wear and tear. Additionally, the configuration of this building with a "t" plan over two-levels is inherently inflexible and is in generally poor condition. A physical assessment of the existing building noted the following facility deficiencies and needs:

Accessibility/Code Deficiencies
The existing building does not fully comply with ADA accessibility. There is no interior pathway form the lower floor to the high floor level at the office wing. There are inadequate sized toilets, lockers, and shower facilities for disabled personnel and the public.

Inadequate Toilet Facilities
The toilet and shower facilities are in very poor condition, are undersized, and do not provide equal services or access for female personnel.

Poor Roofing
The existing roofing membrane is a reinforced thermoplastic membrane that is over 20-years old. It is near the end of its useful life. It also is impacted by poor drainage.

Condition of Plumbing
Plumbing systems are original and are worn. Fixtures have leaked and some have failed requiring frequent repairs.

Inadequate and Obsolete Mechanical Systems
The main air handling systems have exceeded their life expectancy and are in desperate need of major repair or replacement. While the boiler has been replaced at least once, most of the other equipment is original to 1963.

Poor Controls
Various rooms in the building suffer from chronic erratic temperature control.

Excessive Energy Use
The exterior walls lack adequate insulation and the large windows in the office areas and the clerestory in the assemble hall are original non-thermal framing with single-pane glass. This results in excessive energy consumption and poor occupant comfort due to thermal bridging and convective heat loss.

Aged Power Equipment
The power distribution system equipment is original and 57 years old. The transformers are at their capacity and are running warm. Power distribution equipment is approaching and/or past its useful life and should be replaced. The branch circuit panelboards are also original, are approaching and/or past their useful life, and should be replaced. The power distribution is also at capacity and any new power needs have required surface-mounting.

Inadequate Lighting
The lighting controls do not meet current energy code requirements. The luminaires are old and past their useful life and should be replaced.

Physical Security
The existing building has no provisions Anti-Terrorism/Force Protection (ATFP). Specifically, the existing building lacks redundant structural pathways for collapse prevention. There are also limited physical barriers to provide ATFP from the ground level.

Structural/Seismic Performance
Evaluation of the existing structure utilizing the Tier 1 Checklists in ASCE 41-17 reveals a series of minor deficiencies in the gravity and lateral framing elements that are not conducive to the long-term serviceability of the structure and are inconsistent with the building's role as an essential facility to be used as a both a base for disaster response and as a disaster shelter. Primary of the deficiencies noted are the under-reinforcement of existing masonry, inconsistency of lateral load-paths/shear walls, and presence of clearstory windows at the main drill hall which creates a weak-plane between the roof and walls.

The City of Anacortes is in a seismically active area. Buildings located in Anacortes have experienced minor ground motions numerous times, three of the largest include the 1965 Sea-Tac Earthquake, ground motions associated with the eruption of Mount St. Helens in 1980, and the 2001 Nisqually Earthquake.

These ground motions were less than those that are considered in current code-mandated earthquake design and seismic evaluation standards.

3. Facility Goals

The WMD Facilities Office has identified the following program goals for any project addressing the needs of the units occupying WMD Facilities:

Efficient Operations
The facility must support the smooth flow of work through well planned adjacencies.

Compliance with Standards and Regulations
The building will be designed to comply with National Guard Bureau standards and all applicable codes and standards.

Occupant Satisfaction and Safety
Insuring assigned personnel have a positive experience as well as protecting their health and safety are high priorities. Insuring adequate safe operational space is paramount.

Quality
A pleasant and conducive work and training environment should be provided as one means of contributing to mission success and unit effectiveness. This implies access to daylight, quality finishes, appropriate environmental and air quality control, and appropriate acoustics.

Flexibility
The facility should provide a high degree of flexibility to accommodate inevitable change in assigned units, equipment, and technology. One desire is to provide inherent flexibility to grow or shrink areas as operation needs and demand shift over time. As the type and composition of units in the National Guard are subject to change, the readiness center must be designed to accommodate both the change in function of the units housed as well as accommodating expansion of up to 50 percent. Future growth needs are historically faced in unit storage, personal equipment storage, administrative office, and classroom functions. Growth is typically not accommodated in the general services spaces such as the assembly hall and the training work bays.

Energy and Environment
The project is expected to be a high-performance building attaining a minimum certification of LEED Silver by the US Green Building Institute. Energy saving measures with reasonable life-cycle paybacks will be used. Attention will be paid to internal air quality, especially in the shops through material selection and mechanical system design.

Active Design
To encourage personnel health and wellbeing, the project will encourage movement and healthy activities through strategies such as visible and attractive stairs, wayfinding signage that promotes stair use, and attractive open space between functional areas.

Structural/Seismic
The disaster response/shelter mission of the building is an important element in planning and the structure will be designed to the seismic standards for an "essential facility." The renovated building will meet the immediate-occupancy requirements of the ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings. By meeting this standard, the renovated/expanded ARC will survive an earthquake

intact and with only minor damage and can continue functioning as intended.

C. MISSION SUPPORT

1. Mission

The Federal mission of the assigned unit is to provide a trained unit capable of deployment in support of the U.S. Army. Their State mission is to be ready on order of the Governor, to support the civil agencies that have the primary responsibility to protect life and property, and preserve the peace, order, and public safety.

As stated in its 25-Year Statewide Facilities Plan, the Washington Military Department's mission is "to minimize the impact of emergencies and disasters on people, property, environment, and the economy of the State of Washington; provide trained and ready forces for state and federal missions

The proposed project supports the unit's mission in several ways including

- Ensure Disaster Response

  The ARC is 57 years-old and has had no structural improvements. It lacks the structural integrity or load distribution systems required to meet even the minimum seismic survivability standards of current building codes. A renovated ARC will be constructed to current essential-facility standards and will be provided with a standby generator sized to assure 100% operational capability whether for military operations, disaster response, or for use as an emergency community shelter.

- Improve Unit and Individual Readiness

  The size and mission of the unit occupying the ARC has changed considerably since this building was constructed. Not only has the unit increased in size, but the quantity, type, and size of their supporting equipment has also increased. Based upon the current NGB space standards, the supported unit is authorized 26,976 gsf. The existing building provides only just 12,738 gsf. The crowding in the existing building during dirll weekends and the lack of specific training spaces has a significant impact on the ability of the unit to maintain their readiness for their mission.

D. PROJECT NEED

The following elements are the key actions/activities needed to solve the problems of the existing Anacortes Readiness Center:

1. Occupant Safety/Essential Facility Operation

Correct the inadequacies in the seismic resistance of the building and address the exit pathway deficiencies

2. Space Demand/Utilization

Provide an addition to the building to address the overall space shortages.

a. Insufficient Training/Classroom Spaces

Except for the 750-sf locker room which has been converted to use as a multi-use training space, there is no classroom or individual training space in the ARC. National Guard training is conducted

on an individual and small group basis. Dedicated training spaces needed include classrooms, library/learning center, physical fitness room, and a weapons simulation room

b. Insufficient Storage Space

Storage for both unit and individual equipment is required. Individual soldiers have lockers for their personal equipment storage while non-sensitive unit equipment is typically stored in an open area subdivided by wire mesh partitions. The secure material for each unit such as weapons and classified data are required to be stored in a Class-V vault. For equipment that is not temperature sensitive, a separate storage building, provided with minimal heat is authorized and planned. The existing ARC has the required metal storage building and is short nearly 4,000-sf of dedicated secure storage.

c. Insufficient Common Use Space

Common use spaces include the building lobby and circulation, toilets, facilities maintenance, and mechanical/electrical rooms. The armory space allowance also includes a commercial-grade kitchen which, although primarily an armory function, will be used by all occupants. Toilet spaces need to be sized to meet the IBC plumbing fixture requirements and accessibility codes.

3. Reduce Life-Cycle Costs

Provide a facility that is energy efficient, has lower operating and maintenance costs, and will serve the State another 50-years.

4. Support Environmental Goals

Provide a facility that is compliant with RCW 27A State energy performance standard and meets the goals of E.O. 18-01 Section 1. B. & C.

E. PROJECT HISTORY

1. History

The Anacortes Armory was designed in 1962 by local architect Don L. McKee. After graduating from the University of Washington in 1950, McKee establish his practice in his hometown of Anacortes in 1953. He was very active as an Architect in Anacortes, Skagit County, San Juan County, Island County and beyond. He contributed greatly to Anacortes through his architectural design of several schools, banks, municipal buildings, WA State Ferry Terminal Building, Post Office and many highly regarded private residences throughout the region. Construction of the Anacortes Armory was completed in the fall of 1963.

Since its completion, the Armory has had several minor projects. In 1989, new fuel tanks were added. In 1995, the designation of "Armory" was changed to "Readiness Center" to better reflect the expanded civil mission of the National Guard. Also, in that year a metal storage building was built to the north east of the site and a new boiler installed. In 2003, a project was executed which provided some minor interior improvements to the kitchen, public bathrooms, and adding unit ventilators in the office/classroom wing. This project also added exterior volumes over the main and west entrances. This was the last project at the building.

In the 2019 State Capital Budget, the WMD received funding authorization to provide a predesign for the major modernization of the Anacortes Readiness Center (OFM Project 40000004). The WMD Facilities Maintenance Office applied for federal funds to expand/renovate the Anacortes Readiness Center in their 2022 Future Years Defense Plan (FYDP) request.

SECTION 3 - ANALYSIS OF ALTERNATIVES

A. EXPLORING ALTERNATIVES

1. Do Nothing

This alternative maintains the status quo with no renovation or expansion of the existing Readiness Center. No new space will be provided under this alternative.

Advantages

- The primary advantage of this option is that it is the only option that has "0" first cost.

Disadvantages

- The primary disadvantage of this alternative is the significant negative consequences if nothing is done. If this project is not provided, the impact is significantly detrimental to the Alpha Company, 3-161 INF BN, 81st SBCT stationed in this facility due to the current poor condition and inadequate functional use of space. This failing facility and equipment's within it will continue to degrade to the point of total failure and reduce the training throughput significantly, thus reducing readiness of the Washington Army National Guard to meet its Federal combat mission and State support mission.
- The consequences of doing nothing would severely hamper the WMD's effort to improve recruitment and its mission to train assigned for mission preparedness.
- The facility will continue to have issues in meeting physical security standards of the National Guard.

2. Renovate a portion of existing building and expand on the existing site

In this option, the WMD would develop a project to renovate approx. 6,000-gsf of the existing building to correct the most impacting of deficiencies impacting training and operations and provide a 4,000-gsf addition. New addition would connect to the northwest of the building and provide for three flexible classrooms. It would continue over half of the north part of the existing building to increase the area providing secure storage of unit equipment. The renovation would focus on the area north of the Assembly Hall and would include some of the entry lobby area. It would provide a new mechanical/electrical support room, a new concrete weapons vault that meets NGB criteria, new toilet rooms/showers, a physical fitness room and a new catering-style kitchen.

The balance of the existing building would remain largely unchanged with only minor repair to existing finishes, a new roof system, and the addition of fire sprinklers.

Advantages

- Lowest first cost of all but the Do-Nothing Alternative-1.
- Provides the needed training/classroom spaces.
- Most of the building will meet current seismic and energy codes with fire safety improvements to all existing building.
- Maintains the existing metal storage buildings.
- Allows some occupancy of the balance of the Readiness Center during construction.

- Minimal impact on existing site.

Disadvantages

- Leaves 60% of the existing building largely unimproved. This would require a later project to address these issues.
- Requires some relocation of the existing operations during the construction phase.

3. Construct new Readiness Center on a portion of the existing site

In this option, the WMD would develop a two-phase project where the existing Readiness Center remains in operation while a new 20,000-gsf Readiness Center is constructed on the northwest portion of the existing site. In this option, the two existing metal storage buildings are retained. After occupying the new building, the existing building could be either demolished or sold to the City of Anacortes which has expressed interest in the building as a possible Community Center.

Advantages

- Provides all new operational and training space with purpose-designed environment.
- All the building will meet current seismic and energy codes.
- Maintains the existing metal storage buildings.
- Provides potential for community benefit of repurposing existing building.

Disadvantages

- Higher first costs over Alternate-2 due to larger building size.
- Requires greater extent of site development/costs.
- More difficult to meet ATFP standards closer to the site perimeter.

4. Lease equivalent space on another site

In this option, the WMD would vacate the existing building and site and lease existing or purpose-developed facilities that could provide the needed space and function in the quantities permitted by the NGB space authorization.

Advantages

- 100% of authorized space would be provided
- No impact to on-going operations at existing site.
- The need for capital would be spread over 30-years

Disadvantages

- There is very little suitable space in the Anacortes that could suit the operational needs of a Readiness Center. Converting industrial space to meet NGB facility standards would be higher than typical TI costs.
- Having a build-to-suit lease results in the highest Life-Cycle Cost of all alternatives

B. COST ESTIMATES FOR EACH ALTERNATIVE

The following table provides a summary comparison of the studied alternatives:

	Alternative/Description	Total Project Costs *(current escalated)*	LCCA Cost *(30-yr NPV)*
1	Do nothing	$ -	$ -
2	Renovation and expansion	$ 7,349,000	$ 16,120,000
3	Replace with new on exist. site	$ 13,375,000	$ 29,386,000
4	Lease off-site	$ 11,140,000	$ 56,879,000

1. Do Nothing

The direct capital cost to do nothing is $0, however the steadily increasing maintenance costs and the lost opportunity costs from the effect on recruiting and the impact to training would be considerable.

2. Renovate & Expand

The estimated cost to renovate and expand the Building totals $7,349,000 as detailed on the C-100 provided in Attachment 6.1.

3. New Building

The estimated cost to replace the Anacortes Readiness Center with a new facility and remove the totals $13,375,000 as detailed on the C-100 provided in Attachment 6.1.

4. Lease

As the analysis in Attachment 6.1 illustrates, the cost of leasing equivalent space in Anacortes would be $11,140,000 in the first biennium of the lease and $3,374,000 per biennium thereafter over 13 biennia for a total cost of over $56.8 m during the life of a 30-year lease.

A model for this option was not prepared as it would vary greatly based upon the specific existing building chosen for the lease.

C. SCHEDULE ESTIMATES FOR EACH ALTERNATIVE

1. Do Nothing

There is no identified time/schedule for this option.

2. Expansion and Partial Renovate

This alternative assumes that both design and construction funding would be made available in the same biennium. Milestones are anticipated to be:

- Design Phase July 2021 – May 2022
- Construction May 2022 – May 2023
- Close-Out May 2023 – July 2023

3. Replace on Existing Site

This alternative assumes that both design and construction funding would be made available in the same biennium with some appropriation into a second for completion and close-out. Milestones are anticipated to be:

- Design Phase July 2021 – May 2022
- Construction May 2022 – August 2023
- Close-Out August 2023 – November 2023

4. Lease Space

Given the current market for existing space in Anacortes that would be suitable for a Readiness Center it is estimated that identifying a suitable property would require 12-24 months. Following successful negotiation of terms, it is anticipated that design/build the final TI/Site improvements would require an additional 15-months assuming the start of the lease process cannot begin before July 2023.

- Search and Lease: July 2021 – June 2023
- Design/Tenant Improvements: July 2023 – May 2025
- Completion and Occupancy: June 2024– September 2024

SECTION 4 ANALYSIS OF PREFERRED ALTERNATIVE

A. GENERAL DESCRIPTION

1. Nature of the Project

The primary function of any readiness center is to provide an environment in which the assigned units can be administered, train for their assigned missions, and store the immediate equipment that they will require upon mobilization.

The role of the National Guard in the military force structure has changed over the past decade with the Guard playing a more active role in the national defense mission. This is particularly true with the wars in Iraq and Afghanistan, where National Guard and Reserve units made up nearly 28 percent of all deployed troops. Indeed, the recruiting slogan "one weekend a month, two weeks a year" was dropped during the Iraq War as it no longer described service expectations. More and more the National Guard will be relied upon as the Army enters a period of scaling back its full-time personnel. This reliance may include increasing annual training exercises from two weeks to up to seven weeks.

In its mission to support the operational and training needs of its assigned units, the Anacortes Readiness center requires space for administration, training, and material storage in addition to general building and systems spaces.

Administrative

Administrative needs for the assigned unit are very typical of any organization, space for offices, conferencing, administrative workrooms are needed. As command personnel frequently counsel soldiers one-on-one, enclosed offices are needed for the commanders, primary staff officers, executive officers, and senior non-commissioned officers. Security of material and financial documentation also require private offices for unit supply and maintenance personnel adjacent to their areas of control. In keeping with the goal of assuring maximum future flexibility, the balance of administrative space is open office. configuration.

For the proposed project, the majority of existing offices will remain with only minor upgrades to finishes and some systems.

Training

Unit training is conducted on an individual and small group basis. Dedicated training spaces authorized for this type of facility include classrooms, a library/learning center, physical fitness room, a multi-purpose training rooms, and vehicular training work bays. The primary large group training area is the assembly hall, a large high-ceiling multipurpose space.

For the proposed project, the expansion will provide classroom functions. The proposed renovation scope will address the physical fitness and multipurpose training functions. The existing assemble hall will remain.

Storage

Storage for both unit and individual equipment is required to meet mobilization requirements. Individual soldiers have lockers for their personal equipment storage while non-sensitive unit equipment is stored in

an open area subdivided by wire mesh partitions. The secure material for each unit such as weapons and classified data is stored in a vault. For equipment that is not temperature sensitive, a separate storage building, provided with minimal heat is authorized and planned.

The existing facilities provide for individual equipment storage and the non-sensitive storage in the two pre-engineered metal building on the north east part of the site. For the proposed project, these buildings and their functions will remain. The expansion will increase the secure material storage that exists in the north wing. This small addition it will include an overhead door access to the adjacent military vehicle parking to facilitate quicker deployment/response. The proposed renovation scope will move the secure vault to the interior of the building and reconstruct it to a larger size using concrete to meet security regulations.

Common Use Space

Common use spaces include the building lobby and circulation, toilets, facilities maintenance, and mechanical/electrical rooms. The armory space allowance also includes a commercial-grade kitchen which, although primarily an armory function, will be used by all occupants. Toilet spaces will be sized as necessary to meet the IBC plumbing fixture requirements and accessibility codes. As Guard training requires bulky personnel equipment and rapid movement of material and gear, common corridors will be sized to permit unimpeded two-way traffic. This establishes a minimum of 7’-0" clear in major corridors and 5’-0" for minor hallways.

Mechanical and electrical areas will be sized to contain the planned equipment with sufficient area for maintenance and servicing. Adequate clearances to permit removal of large components will also be provided.

For the proposed project, all the existing toilet space will be reconstructed in the existing north wing. The existing mechanical/electrical room is adequately sized so it will be retained and remodeled and provided with new equipment/systems. Anew kitchen that is smaller than authorized can support the food service needs of the unit during regular training. It will be relocated to be adjacent to the exterior for deliveries and to open off the assembly hall so can also meet the feeding needs for disinter response.

2. Occupancy

The project is planned to support A Company of the 3rd Battalion of the 161 Infantry Regiment which is authorized the following personnel levels which are present for Drill Weekends and upon activation/mobilization:

Officers	5
Enlisted	146
TOTAL	151

In the regular non-drill operations, a small cadre of 4-5 individuals occupy the building on an 8-5 normal weekday schedule.

Additionally, the unit has 19-assigned wheeled vehicles (Strykers) and 4 trailers for equipment transportation that are stored on site.

3. Configuration

The existing ARC is designed in an inverted “T” shape with the cross portion of the “T” along the south edge of the site and the north wing forming the base of the “T” (see plan diagrams in Attachment 6.5).

The large Assembly Hall forms the east wing while a north wing houses the Unit Storage, Toilet/Showers. The space directly on the north side of the Assembly Hall was originally an indoor rifle range but it has since been converted to office and personnel support functions. The north wing and Assembly Hall are at a lower floor level than the west wing which is 5-ft higher and houses the office/administrative functions. The building has a public lobby with direct access to the Assembly Hall.

Most of the proposed addition will be at the upper floor level on grade with the existing west wing placed along the west side of the north wing. A small part of the addition will extend the Unit Storage to the north at the lower floor level flush with the existing Unit Storage. Placing the addition at this location will address an existing security issue where the roof of the north wing is easily accessible by a short ladder placed against the building due to that area being partially below grade. To provide internal circulation to the classroom addition, the east portion will form a corridor extending to intersect the existing east-west corridor in the west office wing. A wheelchair lift will be placed adjacent to the existing stairs to provide accessible pathway from the lobby to the west wing and addition.

The north wing and the north space adjacent to the Assembly Hall will be fully renovated and upgraded with new mechanical/electrical room and systems, new toilet/shower rooms, physical fitness room, Multi-purpose training rooms, and a small catering kitchen.

4. Space Needs

The following space allowances are set by Chapter 2 of the National Guard Pamphlet 415-12. The provisions of federal funding require that readiness centers contain the program functions designed within the area allowances contained therein.

Planned areas were based on the assigned strength of the housed units at a total of 151 personnel and the allowances of NG PAM 415-12. This document categorizes the housed functions into two groupings. Schedule-I space includes functions that at common to every readiness center. Schedule II space identifies space for functions that vary depending on the type and size of unit supported.

For the ARC, with 151 total authorized personnel per the MTOE, the authorized space per NG PAM 415-12 is:

FUNCTION	Area Authorized	Area Existing	Area Proposed
Schedule I			
Assembly Hall	5,400	5,422	5,442
Classrooms	2,510	798	2,146
Learning Center	500	0	300
Multipurpose Training Area	1,500	0	854
Kitchen	800	240	360
Break/Vending	300	0	0
Toilets & Showers*	1,740	630	700
Flammable Materials Storage	100	0	0
Lactation Area	80	0	0
Family Readiness Center	250	0	0
Retention Office	110	0	120
Table & Chair Storage	300	308	270
Physical Fitness Area	700	768	700
Subtotal Schedule I	***14,290***	***8,166***	***10,890***

FUNCTION		Area Authorized	Area Existing	Area Proposed
Schedule II				
	Administrative Offices *(Basic + Auth.)*	3,900	2,712	2,422
	Unit Storage *(heated portion only)*	2,700	1,080	1,600
	Locker Room	2,918	0[A]	0[A]
	General Purpose Training Bay	3,168	0	0
	Subtotal Schedule II	***12,686***	***3,792***	***4,022***
	Facilities Maintenance/Storage	810	200	100
	Mechanical/Electrical	1,349	385	385
	Telecom	270	0	0
	Circulation @ 15% - 22%	4,411	1,270	1,830
	Walls @ 10%	3,382	1,152	1,738
	Subtotal Support	***10,222***	***3,007***	***4,022***
TOTAL BUILDING GROSS		**37,198**	**14,965**	**18.965**

Notes:

A. The existing Personal Gear Locker Room is in the adjacent metal storage building and is proposed to remain there.

B. SITE ANALYSIS

1. Site Data

a. Location
The Anacortes Readiness Center is located within the City of Anacortes at 2219 M Avenue. It is bordered on the north by 22nd Street, to the west by M Avenue, to the south by the Anacortes Public Safety Building, with which it shares a parking lot. Immediately east of the site is the Anacortes Manor Apartments.

b. Site Selection
The site has housed the Anacortes Armory since 1963.

c. Building Footprint
The existing ARC building has a footprint of 14,965-gsf. There are two metal storage buildings on the east border of the site, Building-4 containing 5,000-gsf and a Storage Building totalling 2,400-gsf. The Anacortes Public Safety Building has a footprint of approx. 17,000-gsf.

d. Stormwater
The site has a number of surface catch basins that are collected by on-site and conveyed in 6" tight lines to a stormwater main that runs east-west on the south side of 22nd street. Roof drains from the ARC are also conveyed into this system. The stormwater main is owned and stormwater management provided through the City of Anacortes Public Works Department.

e. Ownership or Acquisition
The site is comprised of 3 separate parcels that total 4.56-acres (Skagit County parcel numbers 31914. 31915, and 31921). The site is owned by the State of Washington.

f. Easements
There are no know easements on the site.

g. Potential Neighborhood Issue
The site is bordered by three public roads, 22nd Street to the north, M Avenue to the west, and 14th Street to the south. An apartment complex borders the site on the east. Across the M Avenue is a Anacortes Middle School. South of 24th is the Island Hospital Medical Center. North of 22nd is light commercial, mostly medical services. The neighborhood is not expected to present any issue to the planned preferred alternative.

h. Utilities

1. Water
Water service is provided by City of Anacortes Public Works. 1 2" water main serves the existing building from a meter located in the northwest corner of the building. This line connected to an 8" main in M Avenue. It is anticipated that there is adequate services to the site for domestic water. An additional 4" water line for fire suppression is anticipated.

2. Power
Primary power is provided by Puget Sound Energy. The electrical service was initially installed in 1962 as a 120/240V 1 phase overhead service to a 600-amp Main Switchboard. This service was upgraded in 2003 with a new main switchboard and the service entrance conductors were changed to underground conduits. Load calculations from previous projects indicate that the service has a connected load of approximately 275 amps.

3. Natural Gas
Natural Gas service for the site is provided by Cascade Natural Gas, The point of connection is to a main in M Avenue and the meter is located at the northwest corner of the building.

4. Sewer
Sanitary Sewer Service to the site is provided by the City of Anacortes Public Utilities. A 4" side sewer serves the existing building and exits the building to the south under the Drill Hall. Once outside the building, it connects to a 6" line shared with the Public Safety building. This line connected to a main in 24th Street.

i. Environmental

1. Green Space
The only greenspace on the site is the large lawn area on the northwest part of the site which totals approximately 27,000-sf. Under the preferred alternative, 4,000-sf of this area will be used for the addition with the balance remaining lawn.

2. Potential Mitigation/Contamination
The WMD has begun an AHERA Survey of the existing building and has noted that there may be some asbestos-containing and lead-containing material in the building. Additionally, they noted possible PCB issues with older electrical ballasts. These will be abated prior to the start of the renovation.

The only potential source of site contamination is run-off from the paved military vehicle parking. This area is currently served by an oil/water separator and two stormwater infiltration/treatment ditches along the north east border of the site. Any new impervious area and any existing paring that is rehabilitated will need to follow the Skagit County Stormwater Manual.

3. Wetlands
   There are no known wetlands on or adjacent to the site.

4. Shoreline
   The project is not located on or near any regulated shorelines.

5. SEPA/NEPS Requirements
   The project will require SEPA review and the City of Anacortes will be the determining authority. It is expected to receive a Determination of Non-Significance (DNS) with mitigation after the SEPA review process.

i. Parking, Access, Roads
The proposed project will not make any changes to the existing parking or access. It will not require any new or revised roads. If alternative 3 is pursued, major changes to the military vehicle parking area will be required. In this alternative, if the existing building remains, the new building will remove approximately 1/3 of the existing parking without adequate site to replace the same.

j. Impact During Construction
The amount of renovation and expansion would make concurrent occupancy of the existing readiness center impossible. The unit may need to relocate during construction or "deploy" on site on the open lawn area.

C. CONSISTANCY WITH LONG-RANGE PLANS

The proposed renovation and expansion of the ARC originated through joint efforts of the Washington Military Department (WMD) and Office of Financial Management (OFM). The proposed project was envisioned in response to the recommended Strategic Stationing Plan developed in 2004 for OFM as part of its organizational and facilities assessment of the State Military Department. This report recommended consolidating the existing 33 readiness centers into 21 new or renovated/expanded existing facilities. It identified the expansion/renovation of the Anacortes facility as a key north sound facility asset.

The renovation and expansion of the ARC is consistent with the established policies, goals and objectives of the 25-Year Statewide Facilities Plan of the State of Washington Military Department completed in March 2012.

D. CONSISTENCY WITH OTHER LAWS AND REGULATIONS

The underlying regulatory governance establishing the authorization for National Guard Readiness Centers Title 10, U.S. Code, Chapter 1803 "Facilities for Reserve Components." Facility program standards and requirements for National Guard Readiness Centers are established by the U.S. Army National Guard Bureau and are published in the following Regulations and Guidelines:

- Army Regulation (AR) 405-70, Utilization of Real Property, 12 May 2006: Prescribes the Army's policies, criteria, responsibilities, and procedures for the use of real property.
- Army Regulation (AR) 380-5, Department of the Army Information Security Program; 31 October 2000.
- Army Regulation (AR) 25-2, Information Assurance; 23 March 2009.
- Department of the Army Pamphlet (DA PAM) 420-1-2, Army Military Construction and Non-appropriated Funded Construction Program Development and Execution, 02 April 2009: Prescribes DOD DD Form 1390 and DD Form 1391 for use by installation programmers in preparing and updating these forms. See Appendix C.
- Department of the Army Pamphlet (DA PAM) 420-11, Project Definition and Work Classification, 18 March 2010: Promotes Army-wide uniform interpretation on classification by presenting examples of maintenance, repair, and minor construction projects and policy and guidance governing the classification of work.
- Department of the Army Pamphlet (DA PAM) 415-28, Guide to Army Real Property Category Codes, 11 April 2006: Implements a standard real property coding system on all installations to account for Army-owner and Army-planned facilities.
- Army National Guard Design Guide (DG) 415-1, Army National Guard Readiness Centers Design Guide; 01 June 2011: Provides minimum design standards for readiness centers. See Appendix F.
- Army National Guard Design Guide (DG) 415-4, Training Site Facilities Design Guide, 01 June 2011. Addresses the functions and the unique environmental considerations to address in construction documents development.
- Army National Guard Design Guide (DG) 415-5, General Facilities Design Guide, 01 June 2011. Addresses the functions and the unique environmental considerations to address in the design and construction documents for ARNG facilities that qualify for support from Federal funds.
- Army National Guard Pamphlet (NG PAM) 415-5, Army National Guard Military Construction Program Execution, 31 July 2003: Provides guidance to the CFMO on how to program, design, and execute the State's military construction program.
- Army National Guard Pamphlet (NG PAM) 420-10, Construction and Facilities Management Office Procedures, 18 July 2003: Provides guidance to the CFMO on how to organize, operate, and execute the Real Property Operations and Maintenance program.
- Army National Guard Pamphlet (NG PAM) 415-12, Army National Guard Facilities Allowances, Draft 26 November 2014: Establishes minimum/maximum space allowances for specific National Guard units. See Appendix F.
- National Guard Regulation (NGR) 5-1, National Guard Grants and Cooperative Agreements, 28 May 2010: Provides policy and procedural guidance to be followed in the administration and execution of cooperative agreements (CAs).
- National Guard Regulation (NGR) 415-5, Army National Guard Military Construction Program Development and Execution, 18 July 2003: Provides guidance for planning, programming,

budgeting, and executing all Army National Guard military construction projects funded in whole or in part with military construction appropriation.

- National Guard Regulation (NGR) 415-10, Army National Guard Facilities Construction, 25 July 2003: Establishes policy concerning programming the military construction of those buildings and supporting items for Army National Guard readiness centers and logistics, aviation, and training facilities supportable with Federal funds.
- United Facilities Criteria (UFC) 1-200-02, High Performance and Sustainable Building Requirements; 1 March 2013: Provides minimum requirements and coordinating guidance for planning, designing, constructing, renovating, and maintaining high performance and sustainable facilities that will enhance DOD mission capability by reducing total ownership costs.
- United Facilities Criteria (UFC) 3-701-01, Department of Defense Facilities Pricing Guide; March 2011, Change-5, August 2013: Provides cost and pricing data intended to support preparation of the DoD budget.
- United Facilities Criteria (UFC) 3-710-01A, Code 3 Design with Parametric Estimating; 01 March 2005: Describes intent of Code 3 design directives and provides design policy and technical guidance to the USACE for MILCON projects.
- United Facilities Criteria (UFC) 3-740-05, Handbook: Construction Cost Estimating; 08 November 2010, Change-1, June 2011: Establishes uniform guidance to describe methods, procedures, and formats for the preparation of construction cost estimates and construction contract modification estimates.
- United Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings; 09 February 2012, Change-1, 01 October 2013: Defines ways of minimizing the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they live and work.
- United Facilities Criteria (UFC) 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings; 09 February 2012: Defines building setbacks based on use, location, and construction materials, and building component requirements.
- United Facilities Criteria (UFC) 4-022-03, Security Fences and Gates; 01 October 2013: Provides a unified approach for the design, selection, and installation of security fences and gates.
- United Facilities Criteria (UFC) 4-023-03, Design of Buildings to Resist Progressive Collapse; 14 July 2009, Change 2, 01 June 2013: Provides design requirements necessary to reduce the potential of progressive collapse for new and existing facilities that experience localized structural damage through normally unforeseeable events.
- United Facilities Criteria (UFC) 4-030-01, Sustainable Development; 21 December 2007: Provides instruction, requirements, and references to reduce the total cost of ownership of DoD facilities while minimizing negative impacts on the environment, and promoting productivity, health, and comfort of building occupants by implementing sustainable development principles and strategies using an integrated approach.
- Modified Table of Organization & Equipment (MTOE): Establishes the specific organization of personnel and minimum equipment for each military unit including all units to be housed in the subject project.

- Washington State Military Department Design Manual and Standard Specifications; May 2011.

Design and construction shall also adhere to the latest applicable codes, unless stated otherwise. The general applicable codes include:

- 2018 International Building Code as adopted by the City of Anacortes
- 2018 International Fire Code as adopted by the City of Anacortes
- 2018 International Mechanical Code as adopted by the City of Anacortes
- 2018 Uniform Plumbing Code as adopted by the City of Anacortes
- 2018 National Electrical Code
- 2018 International Fuel Gas Code
- ANSI A17.1 - Safety Code for Elevators and Escalators
- ICC/ANSI A117.1-2009 Accessible and Usable Buildings and Facilities
- 2018 Washington State Energy Code (WSEC)
- Washington State Ventilation and Indoor Air Quality Code
- City of Anacortes Public Works, Land Use and Development Codes and Standards
- Skagit County Public Works Stormwater Regulations

1. **High-Performance Public Buildings**
   The WMD is committed to creating high performance facilities that will ensure the optimal health and productivity of occupants and buildings users. The WMD will register the project with the U.S. Green Building Council under version LEED Version 4.1. It is anticipated that the project will achieve certification to LEED Silver by the United States Green Building Council (USGBC) in accordance with Chapter 39.35d RCW "High Performance Public Buildings". The design will be required a building that cost effectively conserves energy and water.

2. **Greenhouse Gas Emissions Reduction**
   WMD has an ambitious Greenhouse Gas (GHG) reduction goal of realizing a 15% reduction in GHG emissions below 2005 levels by 2030. To assist this goal, the renovated/expanded Anacortes Readiness Center will be designed to meet at least 7 of the Best Practices to reduce greenhouse gas emissions, including:

   - Above-code HVAC system efficiency
   - Utilize natural gas instead of electricity for heating
   - Post occupancy commissioning
   - Time-of-day and occupancy-programmed lighting
   - Energy-efficient lighting
   - Roofing materials with high solar reflectance and reliability
   - Solar power-generation

3. **Archeological and Cultural Resources**
   There are no known issues with development on the proposed site. Given that all the site has been previously developed, it is unlikely any architectural resources would be impacted by the proposed development.

4. **ADA**
   The design will be required to comply with Chapter 11 of the IBC – Accessibility will meet all the requirements of ICC/ANSI A117.1-2009 Accessible and Usable Buildings and Facilities. To the maximum extent possible the tenants of Universal Design will be applied. The detailed design will be reviewed by the design will be reviewed by the State Facility Accessibility Committee for access.

5. **Compliance with Regional Planning**

   Obtaining Land Use Permit from the City of Anacortes will demonstrate GMA Compliance as required under RCW 36.70A.

6. **Additional Information per RCW 43.88.0301 (1):**

   a. Is the proposed project identified in City of Anacortes comprehensive plan?
   Yes

   b. Is the proposed project is located within an adopted urban growth area?
   Yes

   c. If located within an Urban Growth Area, does the project facilitate, accommodate, or attract planned population and employment growth?
   Yes. By keeping a major national guard unit on the site and expanding the building in a way that can better facility community use.

   d. Was there regional coordination during project development?
   Initial discussion with the City of Anacortes Planning and Development and Building Departments was made.

   e. Is the project leveraged with local and or additional funds?
   Yes.
   The project will be funded 50% Federal and 50% State on Restoration while 75% Federal and 25% State on Modernization. Planning & design will be for FY21 (federal) while Restoration and Modernization will be FY 22 (federal). Overall, the project is projected to receive $3.52M in federal funding from the Army National Guard

   f. Have environmental outcomes and the reduction of adverse environmental impacts been examined?
   YES. They will be further developed through the SEPA Process.

E. DEFERRED ISSUES STUDY

There are no known differed issues requiring further study.

F. COMPONENTS EXCEEDING CODE

This project will require the following elements that are identified as exceeding current code-minimums: The Energy Reduction Goal for the project is to provide a system that results in a 20% reduction below (better than) the 2018 Washington State Energy Code (WSEC). The goal will exclude the energy used in the various labs which will be isolated by additional sub-metering.

G. IT SYSTEMS

This project includes administrative and training functions in an existing building that has existing IT systems. It will have a robust IT and telecommunications network internal to the building and interconnected to the WMD telecommunications system. Costs for the proposed systems are identified in the budget documents included herein and will be further reported in detail per RCW 43.88.030 as the project progresses. The proposed project is not classified as a major information technology projects per RCW 43.88.092. None of the proposed IT systems apply to business and administrative applications nor are they enterprise-wide, thus are not subject to RCW 43.105.205.

H. BUILDING COMMISSIONING

Commissioning services will be required per the Washington State Energy Code and as necessary to achieve both fundamental and enhanced commissioning LEED Credits. An Independent Commissioning Authority will be required to direct the enhanced commissioning requirements for LEED version 4.1 The Commissioning Authority will review design documents and make recommendations during the Program phase, design phase, construction phase, acceptance phase, and post acceptance phase. Installation verification will be performed, functional testing, and performance period of measurement and verification. Commissioning documents will be provided during design, process, verification, and operation and maintenance documents.

In conjunction with commissioning a detailed operational training program for the WMD staff will be included in the project to ensure local personnel have the knowledge to operate and maintain the advanced controls to maintain the target high level of efficiency.

I. IMPACT OF FUTURE PLANNING/PHASING

As the type and composition of units in the National Guard are subject to change, the ARC expansion and renovation must be designed to accommodate both the change in function of the units housed as well as accommodating expansion of up to 50 percent. Future growth needs are historically faced in unit storage, personal equipment storage, administrative office, and classroom functions. Growth is typically not accommodated in the general services spaces such as the assembly hall and the training workbays. The planned expansion of the ARC reserves most of the north part of the site for future expansion.

J. PROJECT DELIVERY METHODOLOGY

After careful consideration, WMD proposes to use Design-Bid-Build project delivery. The project is not complex enough, nor is the timeline compressed enough to warrant the additional costs associated with GC/CM delivery. The variety of programming needs also does not lend itself to limited involvement of the users in programming nor the early establishment of a GMP under Design-Build project delivery.

1. Agency Management

It is anticipated that DES will provide direct management of the D-B-B Procurement and subsequent project delivery from inception to the end of the one-year performance guarantee/warranty period. The WMD will be represented in the process by their Facilities Management Offices (FMO) and Capital Projects Manager.

The roles and responsibilities are anticipated to be:

Programming:

WMD Capital Projects and Facilities Team:

- Assists in consultant selection
- Coordinates stakeholder participation
- Participates in detailed programming
- Reviews and approves detailed programming and budget

DES Project Manager:

- Directs consultant selection
- Manages consultant contract
- Assists agency in review and approval of programming and budgets

Design Consultant:

- Provides programming services per agreement

Design:

WMD Capital Projects and Facilities Team:

- Participates in periodic design meetings
- Provides design decisions including program adjustments to achieve budget
- Approves design and estimates at SD, DD, and CD

DES Project Manager:

- Manages consultant contract
- Assists agency in review and approval of programming and budgets

Design Consultant:

- Provides design services per agreement

Bidding:

WMD Capital Projects and Facilities Team:

- Assists in pre-bid conference

DES Project Manager:

- Manages consultant contract
- Issues advertisement for bid

Design Consultant:

- Provides bid services per agreement

Construction: WMD Capital Projects and Facilities Team:

- Participates in periodic construction meetings
- Provides construction decisions including field adjustments and change orders

WMD Project Manager:

- Manages consultant contract
- Monitors quality and schedule
- Advises agency in all matters related to the construction

Design Consultant:

- Provides construction administration services per agreement

Commissioning: WMD Capital Projects and Facilities Team:

- Participates in system commissioning
- Attends operating instruction

DES Project Manager:

- Coordinates selection and contracting of commissioning agent
- Monitors both commissioning agent and design consultant
- Advises agency in all matters related to acceptance of systems

Design Consultant:

- Provides support to the commissioning agent services per agreement

Warranty: WMD Capital Projects and Facilities Team:

- Identifies warranty issues
- Notifies consultant of needed warranty repairs

DES Project Manager:

- Assists in obtaining warranty repairs

Design Consultant:

- Notifies contractor of needed warranty repairs
- Monitors contractor warranty response

K. SCHEDULE

1. Milestone dates for the preferred alternative:
   a. Predesign 07/1/20- 09/15/20
   b. Design 07/1/21 – 04/01/22
   c. Bidding 04/1/22 – 05/01/22

d.	Construction	05/1/22 – 05/01/23
e.	Substantial Completion	06/01/23
f.	Relocate/Reoccupy	06/01/23– 07/01/23
g.	Completion and Occupancy	07/01/23
h.	Warranty/Performance Period	07/01/2023 –07/01/2024

2. VE and Constructability
   In compliance with RCW 43.88.110 (5) (c), value engineering and constructability reviews by independent sources will be included. The Value Engineering will occur mid-way through the DD Phase at approximately 35% completion of the design. This will maximize its impact before the design has progressed too far to make appreciable changes. Conversely, the Constructability review will occur at the 95% completion level to have the documents as close to bid as possible.

3. Potential for Delay
   There is limited potential for delay from the identified schedule as the proposed project is not overly complex, has minimal site work, simple foundations and structural subsystems, and mechanical systems. Another element that reduces delay potential is that the existing building will be unoccupied during the construction phase. This will allow contractor full access to all area of the work in accordance with their preferred schedule and process. There is little impact on their means and methods due to concurrent or adjacent occupancy by the WMD or the Anacortes Police.

4. Permitting or other ordnances potential impact schedule
   The schedule anticipated submission of the project for Land-Use permitting following the Design Development phase and assigned a 4-month duration. The design will be submitted for a General Building Permit at the 65% CD completion to allow for the 4-6 months that the City of Anacortes anticipated for permit processing. This will be closely monitored, and the schedule adjusted to minimize potential impacts.

5. Jurisdictional and Stakeholder Involvement Plan
   The Design Team will conduct programming and design workshops with the user-groups throughout the Schematic and Design Development Phases. Formal Contract Documents reviews will be held at 35%, 90% and 100% completion. Regular (every-other week) progress meetings will be held during the Construction Phase.

   The Contractor will have the responsibility to establish regular on-site inspections with the Anacortes Building Inspector and all other authorities having jurisdiction over the project.

SECTION 5 PROJECT BUDGET ANALYSIS

A. Cost Estimate

1. Major Assumptions

Following are the major assumptions that form the basis of the estimate. See Attachment 6.1 for full elaboration of the basis of cost.

Site:

- The existing stormwater system is adequate for use.
- Sanitary sewer, domestic and fire protection water are available at the site. a new 6-inch sewer service connection will be provided to the existing 8-inch private sewer main south east of the building.
- Anticipated TESC measures include catch basin protection and perimeter protection with straw wattles or a similar Best Management Practice (BMP).
- Dewatering (SSPTD). The SSPTD permit must be obtained prior to building permit approval.
- Existing surface improvements within the project limits will need to be demolished prior construction of the building infill and site improvements. Surface improvements to be demolished include a minor quantity of asphalt pavement, concrete curb, a retaining wall, and landscape.
- Total disturbed area is anticipated to be less than 1 acre; therefore, the project will not be required to apply for coverage under the National Pollution Discharge Elimination System (NPDES) permit through the Department of Ecology.
- Landscape improvements include replacement of any of the existing disturbed grass, new ground covers, low shrubs and columnar trees along the west side of the site.
- Electric service to the facility is adequate. New primary feed will not be required.

Architectural:

As the planned life of the renovated/expanded ARC is 30+ years, proposed materials and systems will been selected on the basis of durability, ease of maintenance, appropriateness, and initial cost. Materials and equipment will comply with NGB criteria and the WMD's "Design Standards and Material Specifications."

- Interior Scope - Renovation
    - The existing interior in the areas identified for complete renovation will be demolished to the structure. The interior in the areas not identified for complete renovation will be provided with new finishes only.
    - New interior wall, finishes, doors, and systems will be provided throughout except where existing walls are indicated to remain. New interior walls will be GWB over metal studs at 16 inches on center. Acoustic treatment will be provided at the walls separating

classrooms. Wall finishes will be durable and easy to maintain. Primary finish will be painted.

- The new vault will be cast concrete and in compliance with NGB Regulations to provide a Class-V security rating.

- Interior Scope - Addition
  - New interior wall, finishes, doors, and systems will be provided throughout except where existing walls are indicated to remain. New interior walls will be GWB over metal studs at 16 inches on center. Acoustic treatment will be provided at the walls separating classrooms. Wall finishes will be durable and easy to maintain. Primary finish will be painted.
  - In large classrooms sound-rated operable partition walls (min. STC = 52) will be provided
  - All interior finishes will be based on the NGB design criteria except that carpet tile will be used in lieu of broadloom to permit ease of partial replacement.
- Exterior Scope - Renovation
  - In areas indicated to receive full renovation, the existing CMU and/or brick walls will remain, but the inside face of the exterior walls will be insulated, and new interior wall framing provided. At existing exterior walls in areas not identified for full renovation, the existing exterior walls will be clean, sealed, and spot repaired as needed.
  - New storefront system with doors will replace existing glazing and curtainwall will be utilized at the existing main entry
- Exterior Scope – Addition
  - The exterior wall materials for the building will be compatible with the context of the existing building. In no small part due to AT/FP setback requirements exterior walls will be of masonry bearing cavity wall construction with a brick and/or concrete block veneer on primary elevations. At areas of less prominence the masonry veneer may be substituted with other robust materials such as pre-finished metal panels with concealed fasteners.
  - Windows, storefront, and/or curtain wall will use thermally broken aluminum frames with color-anodized-aluminum finish and over-sized “bite” to meet UFC 4-010-01 blast requirements for glazing retention. Glazing will consist of clear or lightly tinted insulating glazing units with laminated inner lites and hard coat low emissivity (Low-E) coating.
- Exterior Scope – Roofing
  - All existing and new roofing areas will be provided with a new single-ply membrane installed over rigid insulation attached to a the substrate deck. At the addition, the roofing structure will be pitched at ½ inch per foot and insulation drainage crickets provided at all penetrations and between drains. The color of the roofing will be white to reflect heat gain to achieve LEED credit.

- The roof accent structures added in 2005 will be removed.
- At the addition, skylights over the circulation space will use thermally broken aluminum frames with color-anodized-aluminum finish and over-sized "bite" to meet UFC 4-010-01 blast requirements for glazing retention. Glazing will consist of clear or lightly tinted insulating glazing units with laminated inner lites and hard coat low emissivity (Low-E) coating. Skylights in industrial areas will be tubular-style units.

Structural:

- Evaluation of the existing structure utilizing the Tier 1 Checklists in ASCE 41-17 reveals a series of minor deficiencies in the gravity and lateral framing elements that are not conducive to the long-term serviceability of the structure and are inconsistent with the building's role as an essential facility to be used as a both a base for disaster response and as a disaster shelter. The installation of new roof-to-wall ties and diaphragm force transfer mechanisms are proposed to mitigate these deficiencies.
- The renovations anticipate under the Preferred Alternative include the addition of a classroom wing located immediately to the West of the North wing of the existing structure, as well as reconfiguration of the partitions in several interior spaces. The latter will result in the need for further minor upgrades to the existing structure.
- The new classroom wing will be light framed over conventional foundations, and seismically separated from the existing structure.
- The smaller extension of the north wing will be similarly framed, but seismically integrated into the existing building.
- Lastly, the re-framing of the area to the north of the Drill Hall will require a series of new steel jambs and lintels to support the existing masonry over new openings.

See Attachment 6.2 for the full Structural Report and basis of design.

Mechanical:

HVAC
Mechanical work on this project involves demolishing the following existing mechanical systems, as they are at the end of their useful life:

- The HVAC system serving the gym/drill room and exercise room, including equipment, ductwork, and appurtenances.
- The hydronic heating system, including boilers, pumps, expansion tank, cabinets, radiators, piping, and appurtenances, as well as all individual controls such as thermostats, temperature sensors, etc.
- The kitchen exhaust hood, including its integrated fire suppression system and make-up air unit.
- Individual rooftop exhaust fans and associated ductwork.
- Low wall-mounted cabinet heaters with outside air intakes located in the offices and classrooms.

Separate new heating, cooling, and outside air ventilation systems will be provided to serve the following four building areas:

- West wing—classrooms and offices.

- North wing—storage, shower, and utility.
- East wing—gymnasium/drill room and exercise room.
- Kitchen.

Plumbing

Plumbing work on this project involves demolishing the existing plumbing piping and fixtures, as they are at the end of their useful life and providing new plumbing piping and fixtures for domestic water, sanitary waste and vent, and natural gas. All piping systems will have dedicated shutoff valves as well as point-of-connection shutoff valves

The existing 2-inch domestic water supply entering the building in the Janitor's Closet will be adequate for planned usage. A reduced pressure backflow assembly (RPBA) will be installed at the point of entry. From there domestic water will be distributed through the building to restrooms, showers, and the kitchen. The distribution system will have its own electric water heater, plus a hot water recirculation system and expansion tank. The water heater will produce 140 degrees F water in the tank to limit Legionella growth. A thermostatic mixing valve will reduce the water temperature to 120 degrees F. Each public restroom will have a mixing valve set at 110 degrees F as required by code

Fire Protection

The expansion will cause the building to exceed allowable area for a non-sprinklered building. A new sprinkler system will be required. It will be a light hazard wet sprinkler system. Small areas of the building such as storage areas may require systems of greater hazard classification. Dry sprinklers will be provided for exterior areas of the building such as overhangs and covered loading to provide complete protection.

See attachment 6.3 for detailed Mechanical assessment and basis of design

Electrical:

- Lighting will be LED with daylight zoning and continuous dimming.
- Main Switchboard (MSB) will be rated 480Y/277V, 3-phase, 4-Wire.
- Emergency power for egress lighting will be provided by a central lighting battery inverter located inside the new main electrical room.
- An Analog Addressable Fire Alarm (FA) system will be provided. With this system, each device has a unique address and is polled every few seconds. The devices will include smoke and heat detectors, strobes and combination speaker/strobes, manual pull stations, door holders/closers, tamper and water flow switches, and control relays.
- The communications cabling system shall be designed to conform to the requirements of TIA-568, Generic Telecommunication Cabining for Customer Premises Standard. Cabling will be Cat-6a.
- The credentialed access control system will be used to cover doors in the building.
- The intrusion detection system currently in use in the building shall be re-used
- Instructional Media will consist on in-classroom audio-visual system and equipment.
- Infrastructure for a future PV Array will be included.

See attachment 6.4 for detailed Electrical assessment and basis of design

2. Summary of Costs

Following are the major Uniformat Costs estimated for the construction of the preferred alternative as of 1 July 2020 escalated to mid-point of construction in November 2022:

Uniformat System (level 2)	Total
A. Substructure	
A10 Foundations	$ 79,107
A20 Basement Construction	$ -
B. Shell	
B10 Superstructure	$ 296,311
B20 Exterior Enclosure	$ 391,811
B30 Roofing	$ 329,591
C. Interiors	
C10 Interior Construction	$ 247,969
C20 Stairs	$ -
C30 Interior Finishes	$ 150,306
D. Services	
D10 Conveying Systems	$ 21,402
D20 Plumbing	$ 136,973
D30 HVAC	$ 460,143
D40 Fire Protection	$ 154,094
D50 Electrical	$ 406,638
F. Special Construction & Demolition	
F10 Special Construction	$ 30,498
F20 Selective Demolition	$ 94,704
G. Building Sitework	
G10 Site Preparation	
G20 Site Improvements	$ 252,553
G30 Site Civil/Mechanical Utilities	
G40 Site Electrical Utilities	$ -
G60 Site Stormwater	
Direct Construction Cost Subtotal	**$ 3,052,099**
Estimating Contingencies	$ 535,463
General Conditions	$ 513,648
Overhead & Profit	$ 410,521
Direct Construction Cost (MACC) TOTAL	**$ 4,511,731**

3. C-100

The C-100 provided in Attachment 6.1 identifies the escalated Total Project Costs for the Renovation and Expansion of the Anacortes Readiness Center of $7,349,000 broken down as follows:

Consultant Services	$ 1,541,000
Construction	$ 5,400,000
FF & E	$ 153,700

Artwork	$ 22,550
Other Costs	$ 231,750
TOTAL PROJECT	**$ 7,349,000**

B. PROPOSED FUNDING

The Anacortes Readiness Center Renovation and Expansion is proposed to be funded from Federal and State Appropriation. The project will be funded 50% Federal and 50% State on Restoration while 75% Federal and 25% State on Modernization. Planning & design will be for FY21 (federal) while Restoration and Modernization will be FY 22 (federal). Overall, the project is projected to receive $3.52M in federal funding from the Army National Guard. The balance of the project costs, $3,828,600 will be State funded.

C. FACILITY OPERATIONS AND MAINTENANCE

1. Operating Budget Impact

Annual cost impacts include custodial, utilities, technology, capital maintenance, general repair and furniture/equipment replacement, walkways, landscaping & grounds maintenance, security and administration costs for the new space added through the project.

As the proposed expansion totals 4,000-gsf, the operation and maintenance budget impacts for the added new space is estimated to total $30,000 annually or $7.50 per square foot of new area. Project impact on the WMD annual operating budget is as follows (in 2020 $):

O&M Category	FTE's	Annual Cost/Unit	Quantity	/ Unit	Est. Annual O&M Cost
Janitorial	0.5	$0.75	4,000	/ GSF	$3,000
Utilities	0	$2.50	4,000	/ GSF	$10,000
Techology - Infra. &Tech. Support	0.13	$1.50	4,000	/GSF	$6,000
Capital Maint./Repair	0.25	$1.75	4,000	/ GSF	$7,000
Roads and Grounds	0	$0.50	4,000	/ GSF	$2,000
Security	0	$0.25	4,000	/ GSF	$1,000
Administration	0	$0.25	4,000	/ GSF	$1,000
		TOTAL ANNUAL M & O COSTS			**$30,000**
TOTAL M & O	**0.88**			**$7.50**	**Per GSF**

2. 10-year Capital and Operating Costs

The 10-year forecast of Maintenance and Operations costs for the new 4,000-gsf Addition is as follows:

	Bianneum				
O & M Category	***2023-25***	***2025-27***	***2027-29***	***2029-31***	***2031-2033***
Janitorial	$ 6,000	$ 6,374	$ 6,772	$ 7,195	$ 7,644
Utilities	$ 20,000	$ 21,248	$ 22,574	$ 23,982	$ 25,479
IT/Tech. Support	$ 12,000	$ 12,749	$ 13,544	$ 14,389	$ 15,287
Repair/Maint/Replace	$ 14,000	$ 14,874	$ 15,802	$ 16,788	$ 17,835
Roads & Grounds	$ 4,000	$ 4,250	$ 4,515	$ 4,796	$ 5,096
Security	$ 2,000	$ 2,125	$ 2,257	$ 2,398	$ 2,548
Administration	$ 2,000	$ 2,125	$ 2,257	$ 2,398	$ 2,548
TOTAL	**$ 60,000**	**$ 63,744**	**$ 67,722**	**$ 71,947**	**$ 76,437**

The forecast is based on the annual estimates noted above for the total building area escalated at 3.18% per year.

D. FF&E COSTS

1. Equipment

To ensure that the WMD soldiers have a robust technology infrastructure and specialized learning tools so critical to a visual-based learning program, the C-100 budget includes $132,000 for new and replacement equipment, telecommunication systems and A-V/Instructional Media in classrooms. WMD will provide for telecommunications, IT, and computers, etc. through separate federal procurement.

2. Furnishings

The furniture in the existing Readiness Center is not suitable for continued use/relocation due to condition. New furnishings will be provided and funded through separate federal procurement.

ATTACHMENT 6.1

Budget Estimates

C-100 for Alternative#2 (Preferred)

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated July 2019

Agency	Military Department
Project Name	Anacortes Readiness Center (ARC) Partial Renovation & Addition
OFM Project Number	40000004

Contact Information	
Name	Ron Cross
Phone Number	253-377-8284
Email	ron.cross@mil.wa.gov

Statistics			
Gross Square Feet	10,000	MACC per Square Foot	$422
Usable Square Feet	9,000	Escalated MACC per Square Foot	$451
Space Efficiency	90.0%	A/E Fee Class	B
Construction Type	Armories	A/E Fee Percentage	11.87%
Remodel	Yes	Projected Life of Asset (Years)	30
Additional Project Details			
Alternative Public Works Project	No	Art Requirement Applies	Yes
Inflation Rate	3.18%	Higher Ed Institution	No
Sales Tax Rate %	8.80%	Location Used for Tax Rate	Anacortes
Contingency Rate	10%		
Base Month	September-20		
Project Administered By	DES		

Schedule			
Predesign Start	July-20	Predesign End	September-20
Design Start	July-21	Design End	May-22
Construction Start	May-22	Construction End	May-23
Construction Duration	12 Months		

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Project Cost Estimate

Total Project	**$6,905,067**	Total Project Escalated	**$7,348,674**
		Rounded Escalated Total	**$7,349,000**

STATE OF WASHINGTON

AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated July 2019

Agency	Military Department	
Project Name	Anacortes Readiness Center (ARC) Partial Renovation & Addition	
OFM Project Number	40000004	

Cost Estimate Summary

Acquisition			
Acquisition Subtotal	**$0**	**Acquisition Subtotal Escalated**	**$0**

Consultant Services			
Predesign Services	$75,000		
A/E Basic Design Services	$380,186		
Extra Services	$529,000		
Other Services	$350,808		
Design Services Contingency	$133,499		
Consultant Services Subtotal	**$1,468,494**	**Consultant Services Subtotal Escalated**	**$1,540,605**

Construction			
Construction Contingencies	$421,992	Construction Contingencies Escalated	$451,574
Maximum Allowable Construction Cost (MACC)	$4,219,919	Maximum Allowable Construction Cost (MACC) Escalated	$4,511,732
Sales Tax	$408,488	Sales Tax Escalated	$436,771
Construction Subtotal	**$5,050,399**	**Construction Subtotal Escalated**	**$5,400,077**

Equipment			
Equipment	$132,000		
Sales Tax	$11,616		
Non-Taxable Items	$0		
Equipment Subtotal	**$143,616**	**Equipment Subtotal Escalated**	**$153,685**

Artwork			
Artwork Subtotal	**$22,559**	**Artwork Subtotal Escalated**	**$22,559**

Agency Project Administration			
Agency Project Administration Subtotal	$0		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$0**	**Project Administation Subtotal Escalated**	**$0**

Other Costs			
Other Costs Subtotal	**$220,000**	**Other Costs Subtotal Escalated**	**$231,748**

Project Cost Estimate

Total Project	**$6,905,067**	Total Project Escalated	**$7,348,674**
		Rounded Escalated Total	**$7,349,000**

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	$75,000			
Other				
Insert Row Here				
Sub TOTAL	**$75,000**	**1.0263**	**$76,973**	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	$380,186			69% of A/E Basic Services
Adjust for all CD in Phase-I				
Insert Row Here				
Sub TOTAL	**$380,186**	**1.0398**	**$395,318**	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	$50,000			
Geotechnical Investigation	$18,000			
Commissioning	$80,000			
Site Survey	$16,000			
Testing	$75,000			
LEED Services	$60,000			
Voice/Data Consultant	$40,000			
Value Engineering	$40,000			
Constructability Review	$40,000			
Environmental Mitigation (EIS)	$0			
Landscape Consultant	$30,000			
Acoustic Engineer	$14,000			
Hazmat Consultant	$35,000			
Independant Cost Estimating	$25,000			
Art Coordination	$6,000			
Insert Row Here				
Sub TOTAL	**$529,000**	**1.0398**	**$550,055**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$170,808			31% of A/E Basic Services
HVAC Balancing	in Const.			
Staffing				
Extended CA Support	$180,000			
Insert Row Here				
Sub TOTAL	**$350,808**	**1.0701**	**$375,401**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$133,499			
Other				
Insert Row Here				
Sub TOTAL	**$133,499**	**1.0701**	**$142,858**	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	**$1,468,494**		**$1,540,605**	

Cost Estimate Details

Construction Contracts				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Site Work				
G10 - Site Preparation				
G20 - Site Improvements	$239,750			
G30 - Site Mechanical Utilities				
G40 - Site Electrical Utilities				
G60 - Other Site Construction				
Other				
Insert Row Here				
Sub TOTAL	**$239,750**	**1.0534**	**$252,553**	
2) Related Project Costs				
Offsite Improvements				
City Utilities Relocation				
Parking Mitigation				
Stormwater Retention/Detention				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0534**	**$0**	
3) Facility Construction				
A10 - Foundations	$73,925			
A20 - Basement Construction				
B10 - Superstructure	$276,900			
B20 - Exterior Closure	$366,144			
B30 - Roofing	$308,000			
C10 - Interior Construction	$231,725			
C20 - Stairs	$0			
C30 - Interior Finishes	$140,460			
D10 - Conveying	$20,000			
D20 - Plumbing Systems	$128,000			
D30 - HVAC Systems	$430,000			
D40 - Fire Protection Systems	$144,000			
D50 - Electrical Systems	$380,000			
F10 - Special Construction				
F20 - Selective Demolition	$88,500			
General Conditions	$480,000			
Built-in Furnishings	$28,500			
Estimate Contingency (adjusted)	$500,386			
GC Overhead and Profit	$383,629			
Sub TOTAL	**$3,980,169**	**1.0701**	**$4,259,179**	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	**$4,219,919**		**$4,511,732**	

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7) Construction Contingency				
Allowance for Change Orders	$421,992			
Other				
Insert Row Here				
Sub TOTAL	**$421,992**	**1.0701**	**$451,574**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0701**	**$0**	
Sales Tax				
Sub TOTAL	**$408,488**		**$436,771**	
CONSTRUCTION CONTRACTS TOTAL	**$5,050,399**		**$5,400,077**	

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Cost Estimate Details

Equipment				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
E10 - Equipment	$132,000			
E20 - Furnishings	$0			
F10 - Special Construction				
Other				
Insert Row Here				
Sub TOTAL	**$132,000**	**1.0701**	**$141,254**	
1) Non Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0701**	**$0**	
Sales Tax				
Sub TOTAL	**$11,616**		**$12,431**	
EQUIPMENT TOTAL	**$143,616**		**$153,685**	

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Cost Estimate Details

Artwork					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Project Artwork	$22,559				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	**$22,559**		**NA**	**$22,559**	

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Cost Estimate Details

Other Costs					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Mitigation Costs					
Hazardous Material Remediation/Removal	$160,000				
Historic and Archeological Mitigation					
Permits	$60,000				
Insert Row Here					
OTHER COSTS TOTAL	**$220,000**		**1.0534**	**$231,748**	

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SSW ARCHITECTS
SCHREIBER STARLING WHITEHEAD

ANACORTES READINESS CENTER
PREDESIGN
Alternative - 2 Addition & Partial Renovation
August 25, 2020

BUILDING ADDITION ESTIMATE TOTAL				**$**	**1,053,954**
BUILDING RENOVATION ESTIMATE TOTAL				**$**	**1,562,200**
SITE DEVELOPMENT				**$**	**239,750**
GENERAL CONDITIONS	12 MO @	$	40,000	**$**	**480,000**
SUBTOTAL				**$**	**3,335,904**
ESTIMATE CONTINGENCY @			15.00%		**500,386**
SUBTOTAL					**3,836,290**
GENERAL CONTRACTOR'S OH & P @			10.00%		**383,629**
ESTIMATED MACC TOTAL				**$**	**4,219,919**

EXCLUSIONS:

TESTING AND INSPECTIONS
CONSTRUCTION CONTINGENCY
ARCHITECT/ENGINEERING FEES
PERMITS
TOXIC SOILS/MATERIALS REMOVAL
HAZARDOUS MATERIALS ABATEMENT
PHASING
MOVING/RELOCATION
FURNISHINGS/EQUIPMENT NOT LISTED
STATE SALES TAX
OFF SITE WORK
ESCALATION- REFER TO C-100 FORM

PROJECT: ANACORTES READINESS CENTER - **ADDITION**
LOCATION: ANACORTES, WA
BLDG GSF: 4,000
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION	TOTAL	$/SF
A10	FOUNDATIONS	67,925	16.98
B10	SUPERSTRUCTURE	220,460	55.12
B20	EXTERIOR CLOSURE	233,444	58.36
B30	ROOFING	68,000	17.00
C10	INTERIOR CONSTRUCTION	44,525	11.13
C30	INTERIOR FINISHES	58,600	14.65
D20	PLUMBING	8,000	2.00
D30	HVAC	160,000	40.00
D40	FIRE PROTECTION	24,000	6.00
D50	ELECTRICAL	152,000	38.00
E10	EQUIPMENT	1,400	0.35
E20	FURNISHINGS	15,600	3.90
	ESTIMATE SUBTOTAL	**1,053,954**	**263.49**

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: ANACORTES READINESS CENTER - **ADDITION**
LOCATION: ANACORTES, WA
BLDG GSF: 4,000
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
A10	**FOUNDATIONS**					
02315	STANDARD EXCAVATE FOOTINGS/STEMS/SHEAR WALL	4,000	SFA	2.50	10,000	
03110	SLAB ON GRADE 4"-COMPLETE W/REBAR	4,000	SFA	8.00	32,000	
03120	TIE-IN AT EXISTING SLAB	135	LF	35.00	4,725	
03310	COLUMN FOOTINGS	20	CY	500	10,000	
03310	PERIMETER FOOTINGS/CURBWALLS	160	LF	70.00	11,200	
A10	**FOUNDATIONS**			**DIVISION TOTAL**	**67,925**	**16.98**
B10	**SUPERSTRUCTURE**					
05120	MISC STEEL/LEDGERS/CONNECTIONS @ ROOF	4,000	SFA	2.00	8,000	
05120	STRUCTURAL STEEL COLUMNS/BEAMS @ ROOF	36	TON	5,500	196,460	
05310	DECK @ ROOF	4,000	SF	4.00	16,000	
B10	**SUPERSTRUCTURE**			**DIVISION TOTAL**	**220,460**	**55.12**
B20	**EXTERIOR CLOSURE**					
07420	MASONRY VENEER	3,827	SF	32.00	122,464	
08100	EXT. OH DOOR/FRM/HDWRE	1	EA	12,000	12,000	
08120	EXT. ALUMINUM STOREFRONT DOORS-SINGLE	1	EA	6,000	6,000	
08520	ALUM STOREFRONT/WINDOWS	144	SF	95.00	13,680	
08740	ADD FOR ADA/SECURITY/CARD READERS	1	LS	2,500	2,500	
09110	FRAMED EXT WALL SYSTEM	2,400	SF	32.00	76,800	
B20	**EXTERIOR CLOSURE**			**DIVISION TOTAL**	**233,444**	**58.36**
B30	**ROOFING**					
07400	MEMBRANE ROOFING SYSTEM	4,000	SFA	16.00	64,000	
08600	SKYLIGHT @ ADDITION	1	LS	4,000	4,000	
B30	**ROOFING**			**DIVISION TOTAL**	**68,000**	**13.26**
C10	**INTERIOR CONSTRUCTION**					
08110	INT. DOORS/FRAMES/HDWRE-SGL	3	EA	1,750	5,250	
09100	OPERABABLE PARTITION	30	LF	400	12,000	
09100	INTERIOR PARTITIONS	1,500	SF	12.85	19,275	
10000	MISC. SPECIALTIES	4,000	SFA	2.00	8,000	
C10	**INTERIOR CONSTRUCTION**			**DIVISION TOTAL**	**44,525**	**23.62**
C30	**INTERIOR FINISHES**					
09500	CEILINGS-ALLOWANCE	4,000	SF	6.00	24,000	
09600	MISC WALL FINISHES/PROTECTION	4,000	SFA	1.00	4,000	
09680	CARPET TILE	2,400	SF	6.50	15,600	
09900	HONED/POLISHED CONCRETE	600	SF	5.00	3,000	
09900	PAINTING INTERIOR	4,000	SFA	3.00	12,000	
C30	**INTERIOR FINISHES**			**DIVISION TOTAL**	**58,600**	**9.42**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
D20	**PLUMBING**					
15400	PLUMBING SYSTEM-RAINWATER PER NOTKIN	4,000	SFA	2.00	8,000	
D20	**PLUMBING**			**DIVISION TOTAL**	**8,000**	**9.33**
D30	**HVAC**					
15700	HVAC SYSTEM-PRORATED PER NOTKIN	4,000	SFA	40.00	160,000	
D30	**HVAC**			**DIVISION TOTAL**	**160,000**	**37.80**
D40	**FIRE PROTECTION**					
15300	FIRE PROTECTION SYSTEM-PRORATED PER NOTKIN	4,000	SFA	6.00	24,000	
D40	**FIRE PROTECTION**			**DIVISION TOTAL**	**24,000**	**6.75**
D50	**ELECTRICAL**					
16000	BUILDING ELECTRICAL SYSTEMS PER WH	4,000	SFA	38.00	152,000	
D50	**ELECTRICAL**			**DIVISION TOTAL**	**152,000**	**47.24**
E10	**EQUIPMENT**					
11000	MISC. EQUIPMENT / APPLIANCES	4,000	SFA	0.35	1,400	
E10	**EQUIPMENT**			**DIVISION TOTAL**	**1,400**	**0.35**
E20	**FURNISHINGS**					
12300	FIXED CASEWORK-7 CLASSROOM/,ADMIN,DISPLAY	2,400	SFA	6.50	15,600	
E20	**FURNISHINGS**			**DIVISION TOTAL**	**15,600**	**6.50**
				ESTIMATE SUBTOTAL	**1,053,954**	**263.49**

PROJECT: ANACORTES READINESS CENTER - **RENOVATION**
LOCATION: ANACORTES, WA
BLDG SF: 6,000
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION	TOTAL	$/SF
A10	FOUNDATIONS	6,000	1.00
B10	SUPERSTRUCTURE	56,440	9.41
B20	EXTERIOR CLOSURE	132,700	22.12
B30	ROOFING	240,000	40.00
C10	INTERIOR CONSTRUCTION	187,200	31.20
C30	INTERIOR FINISHES	81,860	13.64
D20	PLUMBING	120,000	20.00
D30	HVAC	270,000	45.00
D40	FIRE PROTECTION	120,000	20.00
D50	ELECTRICAL	228,000	38.00
E10	EQUIPMENT	7,500	1.25
E20	FURNISHINGS	24,000	4.00
F20	SELECTIVE BUILDING DEMOLITION	88,500	14.75
	ESTIMATE SUBTOTAL	**1,562,200**	**260.37**

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: ANACORTES READINESS CENTER - **RENOVATION**
LOCATION: ANACORTES, WA
BLDG SF: 6,000
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
A10	**FOUNDATIONS**					
03300	CUT AND PATCH SLAB ON GRADE	500	SF	12.00	6,000	
	15% AREA					
A10	**FOUNDATIONS**			**DIVISION TOTAL**	**6,000**	**1.00**
B10	**SUPERSTRUCTURE**					
03380	SHEAR TRANSFER INFILL AND MODIFICATION	22	EA	1,000	22,000	
03380	MISC STRUCTURAL IMPROVEMENTS	6,000	SF	3.50	21,000	
05810	SEISMIC/EXPANSION JOINT @ ROOF	168	LF	80.00	13,440	
B10	**SUPERSTRUCTURE**			**DIVISION TOTAL**	**56,440**	**9.41**
B20	**EXTERIOR CLOSURE**					
07410	CLEAN AND SEAL EXISTING MASONRY	3,000	SF	6.50	19,500	
08100	EXT. DOOR/FRM/HDWRE-PAIR	4	EA	4,250	17,000	
08100	EXT. DOOR/FRM/HDWRE-SGL	3	EA	2,400	7,200	
08340	OVERHEAD SECTIONAL DOORS-16' X 16'		EA	12,000		
08520	ALUM STOREFRONT/WINDOWS	200	SF	95.00	19,000	
08740	MISC. HARDWARE/ELEC/CARD READER-EXT OPENINGS	1	LS	10,000	10,000	
09110	FRAMED EXT WALL SYSTEM AT INTERIOR	1,500	SF	32.00	48,000	
09900	EXTERIOR FLASHING/TRIM/SEALANTS-GROSS AREA	4,000	SFA	3.00	12,000	
B20	**EXTERIOR CLOSURE**			**DIVISION TOTAL**	**132,700**	**22.12**
B30	**ROOFING**					
07400	MEMBRANE ROOFING SYSTEM	15,000	SFA	16.00	240,000	
B30	**ROOFING**			**DIVISION TOTAL**	**240,000**	**40.00**
C10	**INTERIOR CONSTRUCTION**					
01000	MISC SPECIALTIES/FITTINGS	6,000	SFA	2.50	15,000	
08110	INT. DOORS/FRAMES/HDWRE-SGL	8	EA	1,750	14,000	
08120	INT. DOORS/FRAMES/HDWRE-DBL	4	PR	3,300	13,200	
08800	CLASS-V VAULT DOOR	1	EA	16,000	16,000	
08520	ALUM STOREFRONT VESTIBULE		SF	95.00		
08740	ADA,CARD READERS,MISC. HDWRE,SECURITY	1	LS	15,000	15,000	
08800	CLASS-V CONCRETE VAULT	400	SF	180	72,000	
09100	INTERIOR PARTITIONS	1,000	SF	16.00	16,000	
10000	WIRE MESH AND GATE/DOOR	1	LS	6,000	6,000	
10500	PLATFORM CHAIR LIFT	1	EA	20,000	20,000	
C10	**INTERIOR CONSTRUCTION**			**DIVISION TOTAL**	**187,200**	**31.20**
C30	**INTERIOR FINISHES**					
09500	CEILINGS-ALLOWANCE	3,000	LS	6.00	18,000	
09600	MISC WALL FINISHES/PROTECTION	6,000	SFA	1.00	6,000	
09680	CARPET TILE		SF	6.50		

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
09680	SHEET FLOORING	760	SF	6.50	4,940	
09900	HONED/POLISHED CONCRETE	600	SF	5.00	3,000	
09600	CONC PATCH/CLEAN/PREP/ SEALER	4,640	SF	3.00	13,920	
09600	MISC WALL FINISHES/PROTECTION	6,000	SFA	1.00	6,000	
09900	PAINTING INTERIOR	12,000	SFA	2.50	30,000	
C30	**INTERIOR FINISHES**			**DIVISION TOTAL**	**81,860**	**13.64**
D20	**PLUMBING**					
15400	PLUMBING SYSTEMS-PRORATED	6,000	SFA	20.00	120,000	
D20	**PLUMBING**			**DIVISION TOTAL**	**120,000**	**20.00**
D30	**HVAC**					
15700	HVAC SYSTEM-PRORATED	6,000	SFA	45.00	270,000	
D30	**HVAC**			**DIVISION TOTAL**	**270,000**	**45.00**
D40	**FIRE PROTECTION**					
15300	FIRE PROTECTION SYSTEM-PRORATED	15,000	SFA	8.00	120,000	
D40	**FIRE PROTECTION**			**DIVISION TOTAL**	**120,000**	**20.00**
D50	**ELECTRICAL**					
16000		6,000	SFA	38.00	228,000	
D50	**ELECTRICAL**			**DIVISION TOTAL**	**228,000**	**38.00**
E10	**EQUIPMENT**					
11000	MISC. EQUIPMENT/APPLIANCES CFCI	6,000	SFA	1.25	7,500	
E10	**EQUIPMENT**			**DIVISION TOTAL**	**7,500**	**1.25**
E20	**FURNISHINGS**					
12300	FIXED CASEWORK	6,000	SFA	4.00	24,000	
E20	**FURNISHINGS**			**DIVISION TOTAL**	**24,000**	**4.00**
F20	**SELECTIVE BUILDING DEMOLITION**					
02000	DEMO ROOF P0P-UPS	5,000	SF	4.00	20,000	
02000	DEMO ROOFING/FLASHING	15,000	SFA	1.50	22,500	
02000	SAWCUTTING & CORING	1	LS	10,000	10,000	
02000	SELECTIVE DEMOLITION	6,000	SFA	6.00	36,000	
F20	**SELECTIVE BUILDING DEMOLITION**			**DIVISION TOTAL**	**88,500**	**14.75**
				ESTIMATE SUBTOTAL	**1,562,200**	**260.37**

PROJECT: ANACORTES READINESS CENTER - **ADDITION & RENOVATION**
LOCATION: ANACORTES, WA
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION	TOTAL	$/SF
G10	SITE PREPARATION	70,000	
G20	SITE IMPROVEMENTS	82,750	
G30	SITE CIVIL / MECHANICAL UTILITIES	47,000	
G40	SITE ELECTRICAL UTILITIES	40,000	
	TOTAL	**239,750**	

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: ANACORTES READINESS CENTER - **ADDITION & RENOVATION**
LOCATION: ANACORTES, WA
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
G10	**SITE PREPARATION**					
02200	SITE DEMOLITION/CLEARING/SAWCUTTING	1	LS	10,000	10,000	
02300	EARTHWORK/GRADING	1	LS	40,000	40,000	
02300	EROSION CONTROL	1	LS	20,000	20,000	
G10	**SITE PREPARATION**			**DIVISION TOTAL**	**70,000**	
G20	**SITE IMPROVEMENTS**					
02775	CONCRETE PAVING/WALKS	1,500	SF	8.50	12,750	
02780	MISC. SITEWORK/CONTINGENCY	1	LS	15,000	15,000	
02900	LANDSCAPING/IRRIGATION RENOVATIONS	1	LS	35,000	35,000	
02900	MISC. SITE IMPROVEMENTS	1	LS	20,000	20,000	
G20	**SITE IMPROVEMENTS**			**DIVISION TOTAL**	**82,750**	
G30	**SITE CIVIL / MECHANICAL UTILITIES**					
02510	RELOCATE GAS LINE	1	LS	12,000	12,000	
02600	STORMWATER MANAGEMENT	1	AL	35,000	35,000	
G30	**SITE CIVIL / MECHANICAL UTILITIES**			**DIVISION TOTAL**	**47,000**	
G40	**SITE ELECTRICAL UTILITIES**					
16200	SITE ELECTRICAL WORK	1	ALLOV	40,000	40,000	
G40	**SITE ELECTRICAL UTILITIES**			**DIVISION TOTAL**	**40,000**	
				ESTIMATE SUBTOTAL	**239,750**	

C-100 for Alternative #3

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated July 2019

Agency	Military Department
Project Name	Anacortes Readiness Center (ARC) - **REPLACEMENT BUILDING**
OFM Project Number	40000004

Contact Information	
Name	Ron Cross
Phone Number	253-377-8284
Email	ron.cross@mil.wa.gov

Statistics			
Gross Square Feet	20,000	MACC per Square Foot	$424
Usable Square Feet	16,000	Escalated MACC per Square Foot	$454
Space Efficiency	80.0%	A/E Fee Class	B
Construction Type	Armories	A/E Fee Percentage	8.12%
Remodel	No	Projected Life of Asset (Years)	30
Additional Project Details			
Alternative Public Works Project	No	Art Requirement Applies	Yes
Inflation Rate	3.18%	Higher Ed Institution	No
Sales Tax Rate %	8.80%	Location Used for Tax Rate	Anacortes
Contingency Rate	10%		
Base Month	September-20		
Project Administered By	DES		

Schedule			
Predesign Start	July-20	Predesign End	September-20
Design Start	July-21	Design End	May-22
Construction Start	May-22	Construction End	August-23
Construction Duration	15 Months		

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Project Cost Estimate

Total Project	**$12,519,484**	Total Project Escalated	**$13,374,882**
		Rounded Escalated Total	**$13,375,000**

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated July 2019

Agency	Military Department
Project Name	Anacortes Readiness Center (ARC) - **REPLACEMENT BUILDING**
OFM Project Number	40000004

Cost Estimate Summary

Acquisition			
Acquisition Subtotal	**$0**	**Acquisition Subtotal Escalated**	**$0**

Consultant Services			
Predesign Services	$75,000		
A/E Basic Design Services	$522,056		
Extra Services	$620,000		
Other Services	$454,547		
Design Services Contingency	$167,160		
Consultant Services Subtotal	**$1,838,763**	**Consultant Services Subtotal Escalated**	**$1,932,384**

Construction			
Construction Contingencies	$847,069	Construction Contingencies Escalated	$910,007
Maximum Allowable Construction Cost (MACC)	$8,470,693	Maximum Allowable Construction Cost (MACC) Escalated	$9,079,313
Sales Tax	$819,963	Sales Tax Escalated	$879,061
Construction Subtotal	**$10,137,725**	**Construction Subtotal Escalated**	**$10,868,381**

Equipment			
Equipment	$200,000		
Sales Tax	$17,600		
Non-Taxable Items	$0		
Equipment Subtotal	**$217,600**	**Equipment Subtotal Escalated**	**$233,768**

Artwork			
Artwork Subtotal	**$45,397**	**Artwork Subtotal Escalated**	**$45,397**

Agency Project Administration			
Agency Project Administration Subtotal	$0		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$0**	**Project Administation Subtotal Escalated**	**$0**

Other Costs			
Other Costs Subtotal	**$280,000**	**Other Costs Subtotal Escalated**	**$294,952**

Project Cost Estimate

Total Project	**$12,519,484**	Total Project Escalated	**$13,374,882**
		Rounded Escalated Total	**$13,375,000**

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	$75,000			
Other				
Insert Row Here				
Sub TOTAL	**$75,000**	**1.0263**	**$76,973**	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	$522,056			69% of A/E Basic Services
Adjust for all CD in Phase-I				
Insert Row Here				
Sub TOTAL	**$522,056**	**1.0398**	**$542,834**	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	$95,000			
Geotechnical Investigation	$18,000			
Commissioning	$80,000			
Site Survey	$16,000			
Testing	$85,000			
LEED Services	$70,000			
Voice/Data Consultant	$40,000			
Value Engineering	$40,000			
Constructability Review	$40,000			
Environmental Mitigation (EIS)	$0			
Landscape Consultant	$45,000			
Acoustic Engineer	$15,000			
Hazmat Consultant	$35,000			
Independant Cost Estimating	$35,000			
Art Coordination	$6,000			
Insert Row Here				
Sub TOTAL	**$620,000**	**1.0398**	**$644,676**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$234,547			31% of A/E Basic Services
HVAC Balancing	in Const.			
Staffing				
Extended CA Support	$220,000			
Insert Row Here				
Sub TOTAL	**$454,547**	**1.0743**	**$488,320**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$167,160			
Other				
Insert Row Here				
Sub TOTAL	**$167,160**	**1.0743**	**$179,581**	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	**$1,838,763**		**$1,932,384**	

Cost Estimate Details

Construction Contracts				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Site Work				
G10 - Site Preparation	$357,500			
G20 - Site Improvements	$195,500			
G30 - Site Mechanical Utilities	$300,000			
G40 - Site Electrical Utilities	$140,000			
G60 - Other Site Construction				
Other				
Insert Row Here				
Sub TOTAL	**$993,000**	**1.0534**	**$1,046,027**	
2) Related Project Costs				
Offsite Improvements				
City Utilities Relocation				
Parking Mitigation				
Stormwater Retention/Detention				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0534**	**$0**	
3) Facility Construction				
A10 - Foundations	$360,000			
A20 - Basement Construction				
B10 - Superstructure	$755,000			
B20 - Exterior Closure	$1,034,500			
B30 - Roofing	$344,000			
C10 - Interior Construction	$235,500			
C20 - Stairs	$0			
C30 - Interior Finishes	$465,000			
D10 - Conveying	$0			
D20 - Plumbing Systems	$160,000			
D30 - HVAC Systems	$800,000			
D40 - Fire Protection Systems	$120,000			
D50 - Electrical Systems	$760,000			
F10 - Special Construction	$50,000			
F20 - Selective Demolition	$0			
General Conditions	$600,000			
Built-in Furnishings	$19,200			
Estimate Contingency (adjusted)	$1,004,430			
GC Overhead and Profit	$770,063			
Sub TOTAL	**$7,477,693**	**1.0743**	**$8,033,286**	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	**$8,470,693**		**$9,079,313**	

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7) Construction Contingency				
Allowance for Change Orders	$847,069			
Other				
Insert Row Here				
Sub TOTAL	**$847,069**	**1.0743**	**$910,007**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0743**	**$0**	
Sales Tax				
Sub TOTAL	**$819,963**		**$879,061**	
CONSTRUCTION CONTRACTS TOTAL	**$10,137,725**		**$10,868,381**	

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Cost Estimate Details

Equipment				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
E10 - Equipment	$200,000			
E20 - Furnishings	by Federal Contract			
F10 - Special Construction				
Other				
Insert Row Here				
Sub TOTAL	**$200,000**	**1.0743**	**$214,860**	
1) Non Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0743**	**$0**	
Sales Tax				
Sub TOTAL	**$17,600**		**$18,908**	
EQUIPMENT TOTAL	**$217,600**		**$233,768**	

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Cost Estimate Details

Artwork					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Project Artwork	$45,397				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	**$45,397**		**NA**	**$45,397**	

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Cost Estimate Details

Other Costs					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Mitigation Costs					
Hazardous Material Remediation/Removal	$160,000				
Historic and Archeological Mitigation					
Permits	$120,000				
Insert Row Here					
OTHER COSTS TOTAL	**$280,000**		**1.0534**	**$294,952**	

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SSW ARCHITECTS
SCHREIBER STARLING WHITEHEAD

ANACORTES READINESS CENTER
REPLACEMENT BUILDING
PREDESIGN
August 25, 2020

BUILDING ESTIMATE TOTAL				**$**	**5,103,200**
SITE DEVELOPMENT				**$**	**993,000**
GENERAL CONDITIONS	15 MO @	$	40,000	**$**	**600,000**
SUBTOTAL				**$**	**6,696,200**
ESTIMATE CONTINGENCY @			15.00%		**1,004,430**
SUBTOTAL					**7,700,630**
GENERAL CONTRACTOR'S OH & P @			10.00%		**770,063**
ESTIMATED MACC TOTAL				**$**	**8,470,693**

EXCLUSIONS:

TESTING AND INSPECTIONS
CONSTRUCTION CONTINGENCY
ARCHITECT/ENGINEERING FEES
PERMITS
TOXIC SOILS/MATERIALS REMOVAL
HAZARDOUS MATERIALS ABATEMENT
PHASING
MOVING/RELOCATION
FURNISHINGS/EQUIPMENT NOT LISTED
STATE SALES TAX
OFF SITE WORK
ESCALATION- REFER TO C-100 FORM

PROJECT: ANACORTES READINESS CENTER - REPLACEMENT BUILDING
LOCATION: ANACORTES, WA
BLDG GSF: 20,000
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION	TOTAL	$/SF
A10	FOUNDATIONS	360,000	18.00
B10	SUPERSTRUCTURE	755,000	37.75
B20	EXTERIOR CLOSURE	1,034,500	51.73
B30	ROOFING	344,000	17.20
C10	INTERIOR CONSTRUCTION	235,500	11.78
C30	INTERIOR FINISHES	465,000	23.25
D20	PLUMBING	160,000	8.00
D30	HVAC	800,000	40.00
D40	FIRE PROTECTION	120,000	6.00
D50	ELECTRICAL	760,000	38.00
E10	EQUIPMENT	50,000	2.50
E20	FURNISHINGS	19,200	0.96
	ESTIMATE SUBTOTAL	**5,103,200**	**255.16**

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: ANACORTES READINESS CENTER - REPLACEMENT BUILDING
LOCATION: ANACORTES, WA
BLDG GSF: 20,000
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
A10	**FOUNDATIONS**					
02315	STANDARD EXCAVATE FOOTINGS/STEMS/SHEAR WALL	20,000	SFA	8.00	160,000	
03110	SLAB ON GRADE 4"-COMPLETE W/REBAR	20,000	SFA	10.00	200,000	
A10	**FOUNDATIONS**			**DIVISION TOTAL**	**360,000**	**18.00**
B10	**SUPERSTRUCTURE**					
05120	MISC STEEL/LEDGERS/CONNECTIONS @ ROOF	20,000	SFA	4.00	80,000	
05120	STRUCTURAL STEEL COLUMNS/BEAMS @ ROOF	100	TON	5,750	575,000	
05310	DECK @ ROOF	20,000	SF	5.00	100,000	
B10	**SUPERSTRUCTURE**			**DIVISION TOTAL**	**755,000**	**37.75**
B20	**EXTERIOR CLOSURE**					
07420	MASONRY VENEER	15,000	SF	32.00	480,000	
08100	EXT. OH DOOR/FRM/HDWRE	2	EA	12,000	24,000	
08120	EXT. ALUMINUM STOREFRONT DOORS-SINGLE	4	EA	6,000	24,000	
08520	ALUM STOREFRONT/WINDOWS	700	SF	95.00	66,500	
08740	ADD FOR ADA/SECURITY/CARD READERS	1	LS	20,000	20,000	
09110	FRAMED EXT WALL SYSTEM	20,000	SF	21.00	420,000	
B20	**EXTERIOR CLOSURE**			**DIVISION TOTAL**	**1,034,500**	**51.73**
B30	**ROOFING**					
07400	MEMBRANE ROOFING SYSTEM	20,000	SFA	16.00	320,000	
08600	SKYLIGHT @ ADDITION	1	LS	24,000	24,000	
B30	**ROOFING**			**DIVISION TOTAL**	**344,000**	**17.20**
C10	**INTERIOR CONSTRUCTION**					
08110	INT. DOORS/FRAMES/HDWRE-SGL	30	EA	1,750	52,500	
08110	INT. DOORS/FRAMES/HDWRE-DBL	10	EA	2,300	23,000	
09100	INTERIOR PARTITIONS	20,000	SF	6.00	120,000	
10000	MISC. SPECIALTIES	20,000	SFA	2.00	40,000	
C10	**INTERIOR CONSTRUCTION**			**DIVISION TOTAL**	**235,500**	**23.62**
C30	**INTERIOR FINISHES**					
09500	CEILINGS-ALLOWANCE	15,000	SF	7.50	112,500	
09600	MISC WALL FINISHES/PROTECTION	20,000	SFA	2.00	40,000	
09680	TILE	2,500	SF	15.00	37,500	
09680	CARPET TILE	6,000	SF	9.50	57,000	
09900	HONED/POLISHED CONCRETE	12,000	SF	6.50	78,000	
09900	MISC INTERIOR FINISHES	20,000	SF	4.00	80,000	
09900	PAINTING INTERIOR	20,000	SFA	3.00	60,000	
C30	**INTERIOR FINISHES**			**DIVISION TOTAL**	**465,000**	**23.25**
D20	**PLUMBING**					

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
15400	PLUMBING SYSTEM PER NOTKIN	20,000	SFA	8.00	160,000	
D20	**PLUMBING**			**DIVISION TOTAL**	**160,000**	**9.33**
D30	**HVAC**					
15700	HVAC SYSTEM-PRORATED PER NOTKIN	20,000	SFA	40.00	800,000	
D30	**HVAC**			**DIVISION TOTAL**	**800,000**	**37.80**
D40	**FIRE PROTECTION**					
15300	FIRE PROTECTION SYSTEM-PRORATED PER NOTKIN	20,000	SFA	6.00	120,000	
D40	**FIRE PROTECTION**			**DIVISION TOTAL**	**120,000**	**6.75**
D50	**ELECTRICAL**					
16000	BUILDING ELECTRICAL SYSTEMS PER WH	20,000	SFA	38.00	760,000	
D50	**ELECTRICAL**			**DIVISION TOTAL**	**760,000**	**47.24**
E10	**EQUIPMENT**					
11000	MISC. EQUIPMENT / APPLIANCES	20,000	SFA	2.50	50,000	
E10	**EQUIPMENT**			**DIVISION TOTAL**	**50,000**	**0.35**
E20	**FURNISHINGS**					
12300	FIXED CASEWORK-7 CLASSES/LABS,ADMIN,DISPLAY	2,400	SFA	8.00	19,200	
E20	**FURNISHINGS**			**DIVISION TOTAL**	**19,200**	**6.50**
				ESTIMATE SUBTOTAL	**5,103,200**	**255.16**

PROJECT: ANACORTES READINESS CENTER - REPLACEMENT BUILDING
LOCATION: ANACORTES, WA
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION	TOTAL	$/SF
G10	SITE PREPARATION	357,500	
G20	SITE IMPROVEMENTS	195,500	
G30	SITE CIVIL / MECHANICAL UTILITIES	300,000	
G40	SITE ELECTRICAL UTILITIES	140,000	
	TOTAL	**993,000**	

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: ANACORTES READINESS CENTER - REPLACEMENT BUILDING
LOCATION: ANACORTES, WA
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
G10	**SITE PREPARATION**					
02200	SITE DEMOLITION/CLEARING/SAWCUTTING	1	LS	35,000	35,000	
02300	EARTHWORK/GRADING	20,000	sf	10.00	200,000	
02300	BUILDING DEMOLITION & REMOVAL	15,000	sf	6.50	97,500	
02300	EROSION CONTROL	1	LS	25,000	25,000	
G10	**SITE PREPARATION**			**DIVISION TOTAL**	**357,500**	
G20	**SITE IMPROVEMENTS**					
02775	CONCRETE PAVING/WALKS	5,000	SF	8.50	42,500	
02780	MISC. SITEWORK/CONTINGENCY	1	LS	8,000	8,000	
02900	LANDSCAPING/IRRIGATION RENOVATIONS	1	LS	100,000	100,000	
02900	MISC. SITE IMPROVEMENTS	1	LS	45,000	45,000	
G20	**SITE IMPROVEMENTS**			**DIVISION TOTAL**	**195,500**	
G30	**SITE CIVIL / MECHANICAL UTILITIES**					
02510	MECHANICAL/CIVIL UTILITIES	20,000	sf	15.00	300,000	
G30	**SITE CIVIL / MECHANICAL UTILITIES**			**DIVISION TOTAL**	**300,000**	
G40	**SITE ELECTRICAL UTILITIES**					
16200	SITE ELECTRICAL WORK	20,000	sf	7.00	140,000	
G40	**SITE ELECTRICAL UTILITIES**			**DIVISION TOTAL**	**140,000**	
				ESTIMATE SUBTOTAL	**993,000**	

LCCA for Alternative #4

Project and Existing Facility Information Sheet

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

*	**Agency**	Washington State Military Department
*	**Project Title**	Anacortes Readiness Center
*	**Date of Analysis:**	**9/1/2020**
	Analysis Period	
*	Years of Analysis (If not 30 or 50)	**30**

Existing Facility Description	The Anacortes Readiness Center (ARC) was constructed in 1963 and contains approx. 15,000-gsf. When originally constructed to support 42 personnel, its current personnel authorization is 150. The building is undersized and does not meet curren operational need or semimic and energy codes.

	Existing Lease Information	**Lease 1**	**Lease 2**	**Lease 3**	**Lease 4**	**Lease 5**	**Lease 6**	**Total**
	Existing Square Feet	15,000						**15,000**
	Lease Start Date / Last Lease Increase							
	Lease End Date							
	Lease Rate per Month							**$ -**
	Lease Rate per SF per Year at End Date							
	Additional Operating Costs per Month	$ -						**$ -**
	Total Lease Costs per Month							**$ -**
*	Persons Relocating	150						**150**
	SF per Person Calculated	100						**100**
	Estimated Lease Renewal Rate - 5 Year	$ -						**$ -**

Lease Option 1 Information Sheet

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

* **New Lease Option 1 Description**	Lease approximately 37,000-gsf (the amount of space authorized fro a readiness center for this type of unit per Army National Guard Standards.

	New Lease Information		
*	Lease Location	Anacortes	Market Area: Northwest
*	Lease Square Feet Type	Gross	
*	New Facility Square Feet	37,000	
*	New Lease Start Date	7/1/2023	
	SF per Person Calculated	247	

	New Lease Costs	**Years of Term**	**Rate / SF / Year**	**Rate / Month**	**Adjusted to FS Rate**	**Total FS Rate / Month**	**Estimated FSG Market Rate**	**Estimated FSG Rate / Month**	**Real Estate Transaction Fees for Term**
*	Years 1 - 5	5	$ 33.00	$ 101,750	$ 45.60	$ 140,600	$ 38.10	$ 117,466	$ 152,625
	Years 6 - 15	10	$ 38.00	$ 117,167	$ 50.60	$ 156,017	$ 44.42	$ 136,970	$ 175,750
	Years 16 - 30	15	$ 42.00	$ 129,500	$ 54.60	$ 168,350	$ 60.40	$ 186,232	$ 291,375
	Years								
	Years								
	Total Length of Lease	30							$ 619,750
	Transaction Fee for first 5 Years	2.50%	*of total rent for first 5 years of term*						
	Transaction Fee for Additional Years	1.25%	*of total rent for term beyond 5 years*						

Note: Real estate transaction fees calculated on base lease - not full service rate including added services and utilities.

Added Services	**New Lease Operating Costs (Starting in current year)**	**Known Cost / SF / Year**	**Estimated Cost / SF / Year in 2023 - Gross**	**Total Cost / Year**	**Cost / Month**
☐	Energy (Electricity, Natural Gas)	$ 2.50	$0.00	$ 92,500	$ 7,708
☐	Janitorial Services	$ 1.80	$0.00	$ 66,600	$ 5,550
☐	Utilities (Water, Sewer, & Garbage)	$ 2.00	$0.00	$ 74,000	$ 6,167
☐	Grounds	$ 0.75	$0.00	$ 27,750	$ 2,313

Escalated to lease start date

Added Services	New Lease Operating Costs (Starting in current year)	Known Cost / SF / Year	Estimated Cost / SF / Year	Total Cost / Year	Cost / Month
☐	Energy (Electricity, Natural Gas)	$ -	$ -	$ -	$ -
☑	Janitorial Services	$ -	$ -	$ -	$ -
☑	Utilities (Water, Sewer, & Garbage)	$ -	$ -	$ -	$ -
☐	Grounds	$ -	$ -	$ -	$ -
☐	Pest Control	$ -	$ -	$ -	$ -
☐	Security	$ -	$ -	$ -	$ -
☐	Maintenance and Repair	$ -	$ -	$ -	$ -
☐	Management	$ -	$ -	$ -	$ -
☐	Road Clearance	$ -	$ -	$ -	$ -
☐	Telecom	$ -	$ -	$ -	$ -
	Additional Parking	$ -	$ -	$ -	$ -
	Other	$ -	$ -	$ -	$ -
	Total Operating Costs	**$ -**	**$ -**	**$ -**	**$ -**

Escalated to lease start date

New Lease One Time Costs	Current Estimate	Calculated (for reference)	
Real Estate Transaction Fees		$ -	*Per Std %*
Tenant Improvements		$ -	*$15 / RSF*
IT Infrastructure		$ 52,500	*$350 / Person*
Furniture Costs		$ 75,000	*$500 / Person*
Building Security and Access Systems			
Moving Vendor and Supplies		$ 30,750	*$205 / Person*
Other / Incentive			
Total	$ -	$ 158,250	

Biennium Budget Impacts for New Lease	Biennium Time Period Start	Finish	Existing Lease Option	New Lease Option 2	Biennium Impact:
21-23 Biennium Lease Expenditure	7/1/2021	6/30/2023	$ -	$ -	$ -
23-25 Biennium Lease Expenditure	7/1/2023	6/30/2025	$ -	$ -	$ -
25-27 Biennium Lease Expenditure	7/1/2025	6/30/2027	$ -	$ -	$ -
27-29 Biennium Lease Expenditure	7/1/2027	6/30/2029	$ -	$ -	$ -
29-31 Biennium Lease Expenditure	7/1/2029	6/30/2031	$ -	$ -	$ -

Ownership Option 1 Information Sheet

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

*	**Project Description**	ALTERNATE-2: Renovate 6,000-sf of existing Readiness Center and add 4,000-sf new construction. Balance of existing building area (11,000-gsf) remains with no improvement.
*	**Construction or Purchase/Remodel**	Construction
*	**Project Location**	Anacortes — Market Area = Northwest

	Statistics	
*	Gross Sq Ft	10,000
*	Usable Sq Ft	9,000
	Space Efficiency	90%
	Estimated Acres Needed	1.00
	MACC Cost per Sq Ft	$451.17
	Estimated Total Project Costs per Sq Ft	$734.90
	Escalated MACC Cost per Sq Ft	$510.17
	Escalated Total Project Costs per Sq Ft	$831.00

*	**Move In Date**	5/1/2024

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	$ 326	$ 250,000	$ 326
A&E	**Consultant Services**			
	A & E Fee Percentage (if services not specified)		8.71% Std	8.71%
	Pre-Schematic Design services	$ 76,973		
	Construction Documents	$ 395,318		
	Extra Services	$ 550,055		
	Other Services	$ 375,401		
	Design Services Contingency	$ 142,858		
	Consultant Services Total	$ 1,540,605	$ 358,782	$ 1,540,605
	Construction Contracts			
C	Site Work	$ 252,553		

MAC				
	Related Project Costs	$ -		
	Facility Construction	$ 4,259,179		
	MACC SubTotal	$ 4,511,732	$ 3,000,000	$ 4,511,732
	Construction Contingency (5% default)	$ 451,574	$ 225,587	$ 451,574
	Non Taxable Items			$ -
	Sales Tax	$ 436,771	$ 383,497	$ 436,771
	Construction Additional Items Total	$ 888,345	$ 609,084	$ 888,345
	Equipment			
	Equipment	$ 141,254		
	Non Taxable Items			
	Sales Tax	$ 12,431		
	Equipment Total	$ 153,685		$ 153,685
	Art Work Total	$ 22,559	$ 22,559	$ 22,559
	Other Costs			
	Hazmat & Permits	$ 231,748		
	Other Costs Total	$ 231,748		$ 231,748
	Project Management Total	$ -		$ -
	Grand Total Project Cost	**$ 7,349,000**	**$ 4,240,424**	**$ 7,349,000**

Construction One Time Project Costs			
One Time Costs	**Estimate**	**Calculated**	
Moving Vendor and Supplies	$ 85,000	$ 34,771	*$205 / Person in FY09*
Other (not covered in construction)			
Total	$ 85,000	$ 85,000	

	Ongoing Building Costs				
Added Services	New Building Operating Costs	Known Cost /GSF/ 2024	Estimated Cost /GSF/ 2024	Total Cost / Year	Cost / Month
☑	Energy (Electricity. Natural Gas)	$ 2.50	$ 1.28	$ 25,000	$ 2,083
☑	Janitorial Services	$ 1.80	$ 1.56	$ 18,000	$ 1,500
☑	Utilities (Water, Sewer, & Garbage)	$ 2.00	$ 0.43	$ 20,000	$ 1,667
☑	Grounds	$ 0.75	$ 0.07	$ 7,500	$ 625
☑	Pest Control	$ 0.15	$ 0.11	$ 1,500	$ 125
☑	Security	$ 0.40	$ 0.10	$ 4,000	$ 333
☑	Maintenance and Repair	$ 2.00	$ 6.65	$ 20,000	$ 1,667
☑	Management	$ 0.70	$ 0.50	$ 7,000	$ 583
☑	Road Clearance	$ -	$ 0.05	$ 496	$ 41
☑	Telecom	$ 2.30	$ -	$ 23,000	$ 1,917
	Additional Parking	$ -	$ -	$ -	$ -
	Other	$ -	$ -	$ -	$ -
	Total Operating Costs	**$ 12.60**	**$ 10.75**	**$ 126,496**	**$ 10,541**

Ownership Option 2 Information Sheet

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

*	**Project Description**	ALTERNATE-3: Replace existing 15,000-gsf Readiness Center with new 20,000-gsf building on existing site. Existing metal storage building remain. Existing Readiness Center is sold to City.
*	**Construction or Purchase/Remodel**	Construction
*	**Project Location**	Anacortes — Market Area = Northwest

	Statistics	
*	Gross Sq Ft	20,000
*	Usable Sq Ft	16,000
	Space Efficiency	80%
	Estimated Acres Needed	2.00
	MACC Cost per Sq Ft	$453.97
	Estimated Total Project Costs per Sq Ft	$668.75
	Escalated MACC Cost per Sq Ft	$529.34
	Escalated Total Project Costs per Sq Ft	$779.79

*	**Move In Date**	8/1/2025

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	$ 118	$ 500,000	$ 118
A&E	**Consultant Services**			
A&E	A & E Fee Percentage (if services not specified)		7.95% Std	7.95%
A&E	Pre-Schematic Design services	$ 76,973		
A&E	Construction Documents	$ 542,834		
A&E	Extra Services	$ 644,676		
A&E	Other Services	$ 488,320		
A&E	Design Services Contingency	$ 179,581		
	Consultant Services Total	$ 1,932,384	$ 722,005	$ 1,932,384
	Construction Contracts			
C	Site Work	$ 1,046,027		

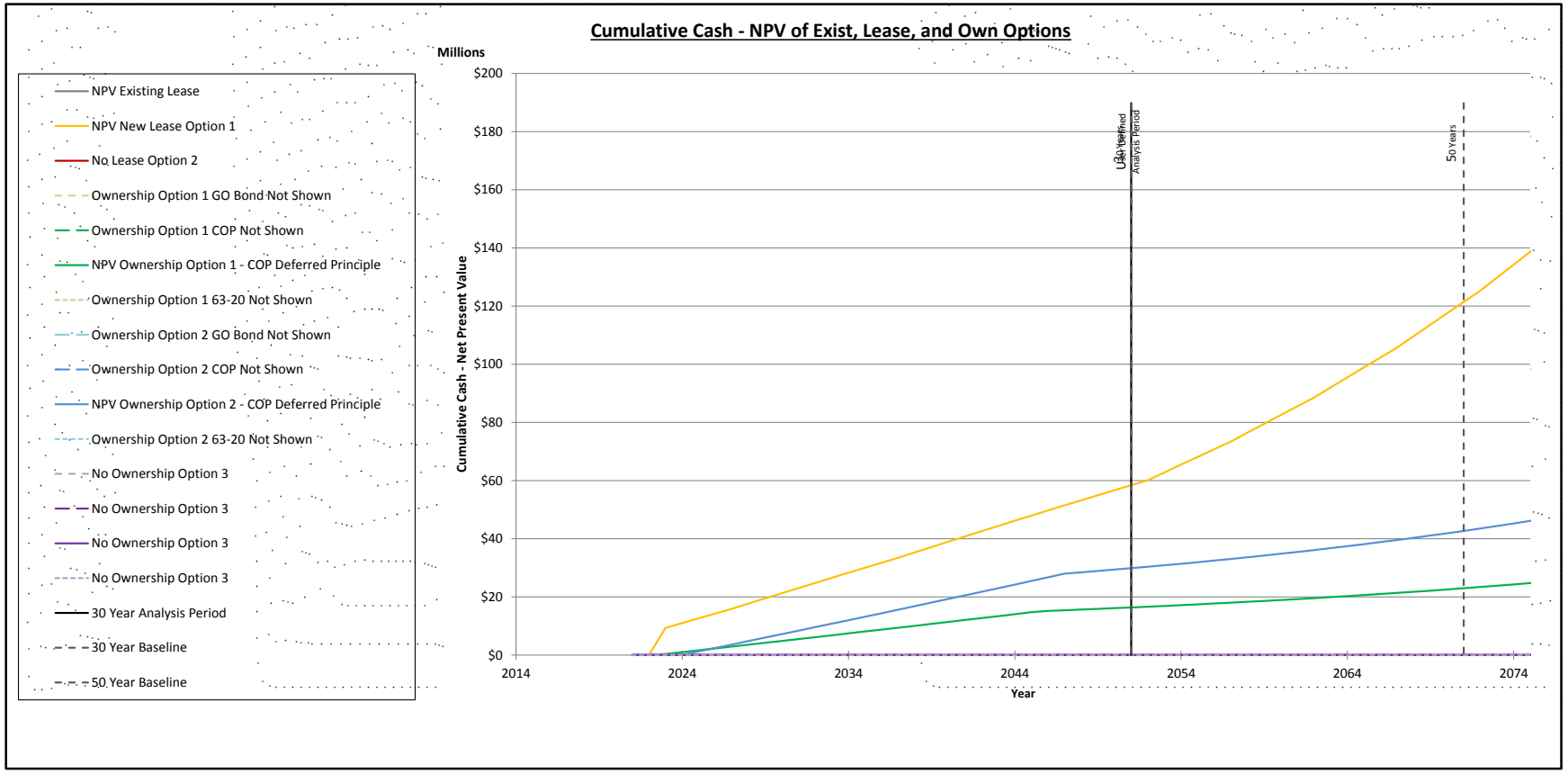
MAC				
	Related Project Costs	$ -		
	Facility Construction	$ 8,033,286		
	MACC SubTotal	$ 9,079,313	$ 6,000,000	$ 9,079,313
	Construction Contingency (5% default)	$ 910,007	$ 910,007	$ 910,007
	Non Taxable Items			$ -
	Sales Tax	$ 879,061	$ 771,742	$ 879,061
	Construction Additional Items Total	$ 1,789,068	$ 1,789,068	$ 1,789,068
	Equipment			
	Equipment	$ 214,860		
	Non Taxable Items	$ -		
	Sales Tax	$ 18,908		
	Equipment Total	$ 233,768		$ 233,768
	Art Work Total	$ 45,397	$ 45,397	$ 45,397
	Other Costs			
	Hazmat & Permits	$ 294,952		
	Other Costs Total	$ 294,952		$ 294,952
	Project Management Total	$ -		$ -
	Grand Total Project Cost		**$ 9,056,470**	**$ 13,375,000**

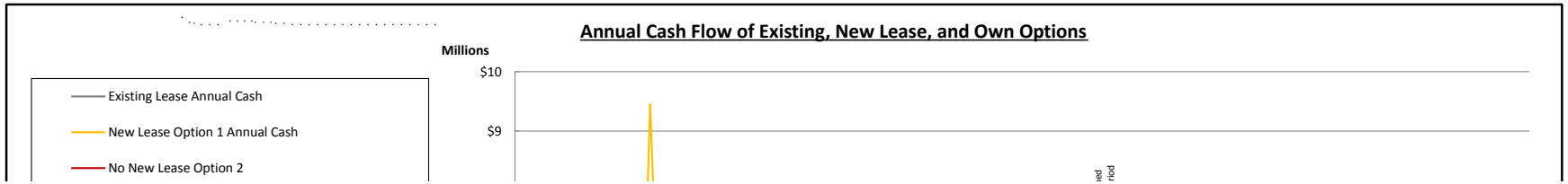
Construction One Time Project Costs			
One Time Costs	**Estimate**	**Calculated**	
Moving Vendor and Supplies	$ 85,000	$ 34,771	*$205 / Person in FY09*
Other (not covered in construction)			
Total	$ 85,000	$ 85,000	

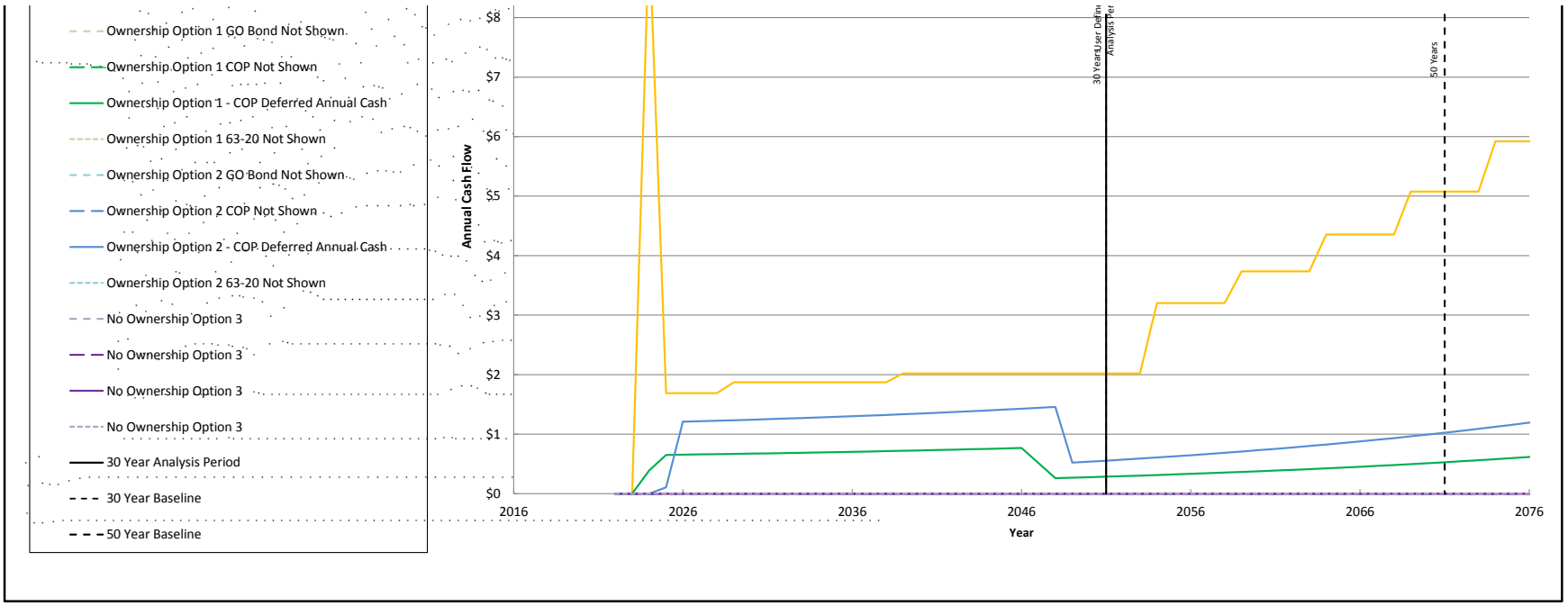
	Ongoing Building Costs				
Added Services	New Building Operating Costs	Known Cost /GSF/ 2025	Estimated Cost /GSF/ 2025	Total Cost / Year	Cost / Month
☑	**Energy (Electricity. Natural Gas)**	$ 2.50	$ 1.32	$ 50,000	$ 4,167
☑	**Janitorial Services**	$ 1.80	$ 1.61	$ 36,000	$ 3,000
☑	**Utilities (Water, Sewer, & Garbage)**	$ 2.00	$ 0.45	$ 40,000	$ 3,333
☑	**Grounds**	$ 0.75	$ 0.08	$ 15,000	$ 1,250
☑	**Pest Control**	$ 0.15	$ 0.12	$ 3,000	$ 250
☑	**Security**	$ 0.40	$ 0.10	$ 8,000	$ 667
☑	**Maintenance and Repair**	$ 2.00	$ 6.85	$ 40,000	$ 3,333
☑	**Management**	$ 0.70	$ 0.51	$ 14,000	$ 1,167
☑	**Road Clearance**	$ -	$ 0.05	$ 1,023	$ 85
☑	**Telecom**	$ 2.30	$ -	$ 46,000	$ 3,833
	Additional Parking	$ -	$ -	$ -	$ -
	Other	$ -	$ -	$ -	$ -
	Total Operating Costs	**$ 12.60**	**$ 11.09**	**$ 253,023**	**$ 21,085**

	Financial Comparisons	Existing Lease	Lease 1	Lease 2	Ownership 1				Ownership 2				Ownership 3			
Years	Financing Means	Current	Current	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	$ -	$ 136,922,204	$ -			$ 25,487,736				$ 47,608,894				$ -	
	50 Year Net Present Value	$ -	$ 117,537,679	$ -			$ 22,564,173				$ 41,886,140				$ -	
	Lowest Cost Option (50 Years)		3				1				2					

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







Financial Assumptions

Date of Life Cycle Cost Analysis:	9/1/2020
Analysis Period Start Date	7/1/2021
User Input Years of Analysis	30

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%	3.720%	3.720%	3.540%	3.720%	3.720%	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.

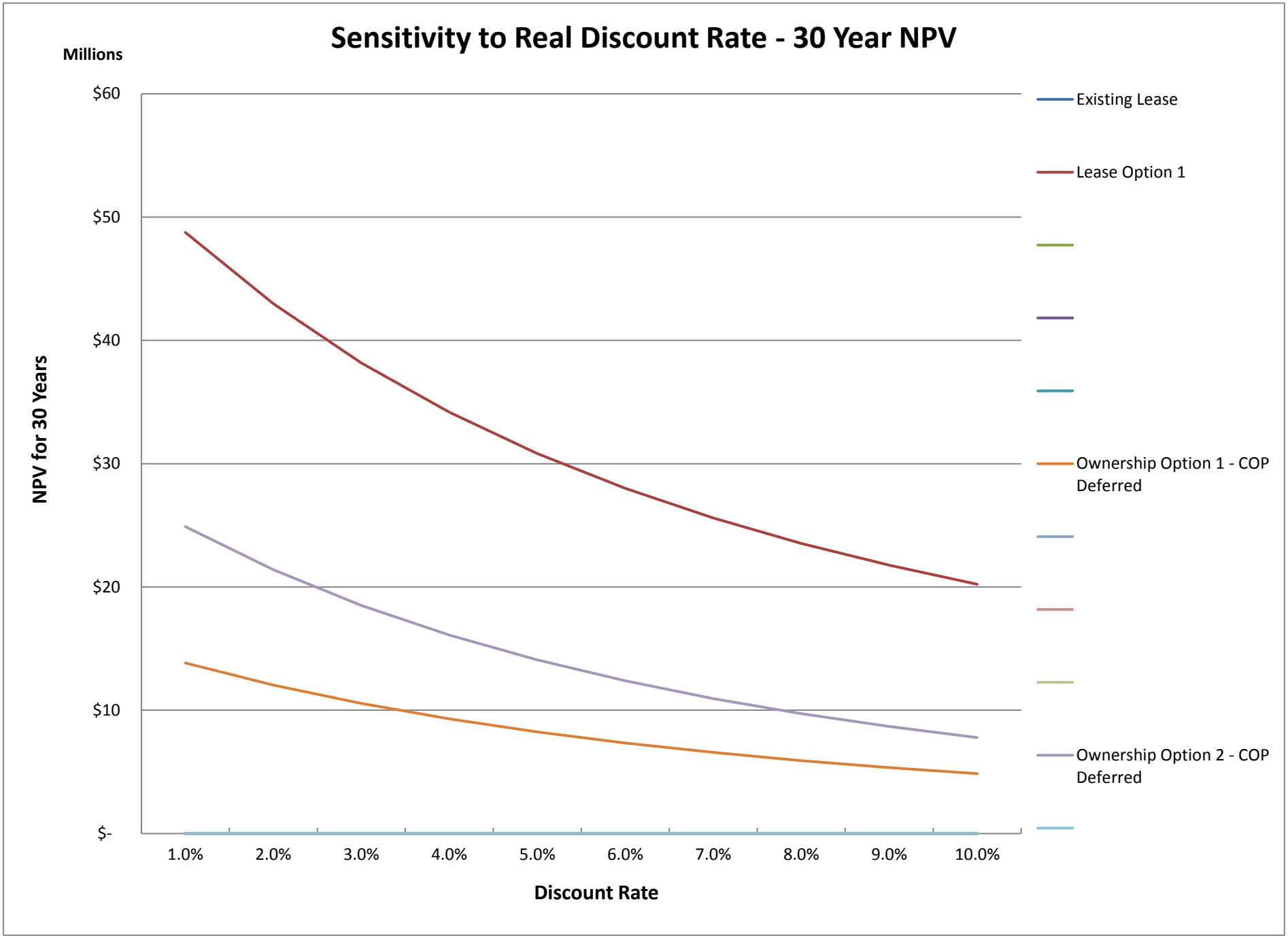
New Lease Assumptions

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 estimated at $168.65 per rentable square foot.
IT infrastructure is estimated at $2600 per person.
Furniture costs are estimated at $6066.67 per person and do not include new workstations.
Moving Vendor and Supplies are estimated at $300 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 $420.00 per square foot.
See the Capital Construction Defaults tab for more construction assumptions.

Discount Rate Sensitivity



ATTACHMENT 6.2

Structural Findings & Report

Army National Guard – Anacortes Readiness Center Structural Pre-Design Assessment

2219 M Ave, Anacortes, WA 98221

August 7, 2020

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This pre-design study of the Army National Guard Readiness Center in Anacortes, Washington, seeks to evaluate the structural feasibility of the renovations to the building proposed by Schreiber Starling Whitehead. Due the anticipated cost of the upgrades and their impact on the existing structure, the planned program requirements for the upgrade and continued use of this building are expected to require a level of retrofit that will fall under the International Existing Building Code classification of Substantial Alteration. Consequently, this study is composed of two parts: a seismic evaluation consistent with the immediate-occupancy requirements of the *ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings;* and a concept-level structural analysis of the proposed renovations.

Evaluation of the existing structure utilizing the Tier 1 Checklists in ASCE 41-17 reveals a series of minor deficiencies in the gravity and lateral framing elements that are not conducive to the long-term serviceability of the structure and are inconsistent with the building's role as an essential facility to be used as a both a base for disaster response and as a disaster shelter. The installation of new roof-to-wall ties and diaphragm force transfer mechanisms are proposed to mitigate these deficiencies.

The renovations proposed by Schreiber Starling Whitehead, including the addition of a classroom wing located immediately to the West of the North wing of the existing structure, as well as reconfiguration of the partitions in several interior spaces, will result in the need for further minor upgrades to the existing structure. The new classroom wing will be light-framed over conventional foundations, and seismically separated from the existing structure. The smaller extension of the north wing will be similarly framed, but seismically integrated into the existing building. Lastly, the re-framing of the area to the north of the Drill Hall will require a series of new steel jambs and lintels to support the existing masonry over new openings.

INTRODUCTION

The seismic evaluation of the Anacortes Readiness Center follows the recommendations of the *ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings,* which is the national standard for the seismic evaluation of existing structures. Additional information about the methodology is included in Appendix A of this report. The purpose of an assessment under this code is to determine the risk to human life posed by damage or failure of primary structure and architectural elements in a major earthquake. The Anacortes Readiness Center has been evaluated in a manner consistent with an Immediate-Occupancy level of building performance, with the goal that the building survives an earthquake intact and with only minor damage, and can continue functioning as intended. The results of the evaluation, along with a series of recommended mitigation measures to address the deficiencies identified, are included as an appendix to this report.

The analysis and concept-level design of the proposed structural renovations to the Anacortes Readiness Center are consistent with the requirements of the 2018 International Existing Building Code, and are compliant with the load and design criteria mandated by the 2018 International Building Code. The purposes of this analysis is to assess the feasibility of the proposed upgrades, provide conceptual design approaches to the retrofit of existing structural elements, and to assist in the identification and capture of the costs associated with both the required seismic upgrades and the architectural renovations.

BUILDING DESCRIPTION

Constructed in 1962, the Anacortes National Guard Armory (now readiness center) is a single-story mid-century modern reinforced masonry structure located in Anacortes, Washington. Comprised of three distinct wings of varying roof height, the structure consists of a drill hall to the East, a storage and utilities wing to the North, and an elevated office wing to the West. In total, the three wings contain approximately 14,300 square feet.

Gravity Framing System

Primary gravity support for the building varies across the wings. To the North, in the utility wing, concrete footings and stem walls support reinforced masonry walls, which in turn carry a wood-framed and plywood sheathed roof. At the office wing to the west, conventional concrete footings support a steel post and beam frame infilled with masonry and glazing at the exterior, and reinforced masonry walls at the interior. A wood-framed and plywood sheathed roof is supported above. To the East, the drill hall consists of steel t-shaped columns supported on conventional spread footings that carry a glulam girder roof clad in straight sheathing. Infill masonry walls extend from grade up to clerestory windows.

Lateral Framing System

The lateral force resisting system of the same elements as the gravity framing system. The reinforced masonry walls in all wings serve as shear wall elements, while the wood-framed and sheathed roof elements act as diaphragms to collect and distribute lateral forces. At the drill hall, where the infill masonry walls stop below the clerestory windows, the steel t-shaped columns cantilever from the tops of the walls up to the roof framing above and collect lateral forces through in-plane bending.

Exterior Walls/Building Façade System

The construction of the exterior walls varies across the different building wings. To the West in the office wings, the exterior walls are primarily infill consisting of a 4" brick veneer backed by 4" CMU. In the utility wing to the north, the exterior walls are of similar construction, but serve as primary gravity support for the

roof above. At the drill hall, the exterior walls are comprised of 12" partially-grouted CMU clad in 4" brick veneer.

Interior Walls

With a few exceptions, the interior walls are predominately comprised of 8" reinforced CMU in all wings, and serve as the primary load bearing and lateral force resisting systems.

PROPOSED RENOVATIONS AND STRUCTURAL SOLUTIONS

Northwest Addition

The new addition will originate at the juncture between the North and West wings, and will extend northwards to enclose three new classroom spaces and a corridor. We anticipate that the framing will consist of wood-framed stud walls clad in 4" brick veneer to match the existing structure, supporting an engineered wood joist framed and plywood sheathed roof. Because the new extension will sit at the same elevation as the existing office wing, the footing below the corridor shear and bearing walls will be dropped to avoid surcharging the existing concrete retaining wall on the west face of the utility wing, and will step down to the elevation of the lower footings where it intersects that portion of the building. Most importantly, this addition will be seismically isolated from the existing structure on its two adjoining sides, requiring a seismic gap at these interfaces. A concrete slab on grade will form the floor.

North Addition

The small addition to the north of the North wing will be similarly constructed, with wood-framed shear and bearing walls clad in 4" brick veneer, supported over conventional concrete footings. A wood-framed roof will cap the addition, and a concrete slab on grade will form the floor. The addition will not be seismically separated from the existing structure.

Drill Hall North Annex Re-frame

Several new openings will be introduced into the north wall of the small annex to the north of the drill hall. New steel columns and lintel beams will support the existing masonry over the new openings, and wood-framed strong-back walls will restrain the remaining CMU walls against out-of-plane forces.

STRUCTURAL DESIGN CRITERIA

CODES, REGULATIONS AND STANDARDS

- 2018 International Building Code (2018 IBC)
- ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
- ACI 318-14 Building Code Requirements for Structural Concrete
- AISC Steel Construction Manual, Fourteenth Edition

LOADINGS

Live Loads

Live Load	Min per ASCE 7 (psf)	Design for this project (psf)	Concentrated (lbs)[4]
Classrooms and Offices	50[3]	**50**	2000
Corridors and Stairs	100	**100**	2000
Corridors above Level 1	80	**80**	2000

Roof (snow)	25	**25**	-
Storage – light & mechanical rooms	125 NR	**125 NR**	2000

NR: Not reducible

1. No live load reduction for beams, 20% max for columns
2. No live load reduction is used on beams because of future flexibility and vibration considerations. Columns have LL reduction limited as noted below.
3. Partition live load of 15 psf for all offices or other buildings where partition locations may be subject to change unless live load exceeds 80 psf.
4. Concentrated loads are distributed over an area of 2.5 ft x 2.5ft.

Live Load Reduction:

- ASCE 7-16 Sect 4.8: when $K_{LL}A_T > 400$ ft^2
- A_T = tributary area, K_{LL} = element factor per Table 4-2
- $L = L_o(0.25 + 15/ \text{sqrt}(K_{LL}A_T)$, but not less than $0.5L_o$ for members supporting 1 floor and not less than $0.4L_o$ for other members.
- Live loads over 100 psf may not be reduced except for members supporting two or more floors may be reduced by maximum 20%.

SEISMIC DESIGN CRITERIA

The first issue in establishing seismic design requirements per the building code is to determine the classification of the building for Importance Factors for seismic, wind and snow. The Categories for purpose of determining Importance Factors for the structural design are not the same as the Occupancy Classifications in IBC Chapter 3. This is because the requirements in Chapter 3 are specific to the life-safety issues of each occupancy group (e.g. fire and exiting). The structural Occupancy Categories are established to assign levels of risk of structural damage relative to the need for the building after a catastrophic event, or the risk based upon the number of people in the facility and the ability to evacuate the building, if needed, in a timely manner.

This building will be designed under the requirements for Structural Category IV, Essential Facilities. For this category the building code requires the following:

1. Structure designed for a Seismic Importance Factor of 1.5, Snow Importance Factor of 1.20 and Wind Importance Factor of 1.0.
2. Seismic Design Criteria:
   Site Class: D; Fa = 1.047; Fv = -
   Seismic Design Category: D
   Structural System: Building Frame System; Special Reinforced Concrete Shear Wall
   R = 6, Wo = 2.5, Cd = 5,
   Site coefficients: Ss = 1.131g; S_{DS} = 0.79; S1 = 0.402g; S_{D1} = -
   Seismic Base Shear Equation Cs = 0.182g

CONCLUSION

The proposed renovations to the Anacortes Readiness Center as presented by Schreiber Starling Whitehead are structurally feasible and, conducted in conjunction with the structural upgrades identified in the Seismic Analysis Report, will not decrease the ability of the structure to continue performing in its current capacity.

Jeremiah W. Bowles PE, SE

Associate

APPENDIX A – STRUCTURAL RENOVATION PLANS AND DETAILS

step footing down to match depth of existing

seismic joint

2'-0" x 12" deep footing, cont. typ.

2x8 @ 16" o.c. shear wall w/ 4" masonry veneer above 12" concrete stem wall, typ.

2x8 @ 16" oc.c bearing wall w/ 4" masonry veneer above 12" concrete stem wall, typ.

ADDITION

EXISTING (Renovated)

2x8 @ 16" oc.c bearing wall w/ 4" masonry veneer above 12" concrete stem wall, typ.

2'-0" x 12" deep footing, cont. typ.

2x6 @ 16" o.c. strongback wall, typ.

HSS 5x5x1/4" jamb

2x6 @ 16" o.c. strongback wall, typ.

3'-0"x12" deep offset footing - drop min. 2'-0" to avoid surcharge of (e) concrete retaining wall, adjacent. typ.

2x8 @ 16" o.c.shear wall, typ.

2x8 shear wall w/ 4" masonry veneer above 12" concrete stem wall

seismic joint

ADDITION

EXISTING (Renovated)

(e) concrete footing, as occurs

wood-framed demising wall per arch.

Provide wood-framed enclosure/strongback walls both sides of (e) URM wall - or - remove (e) URM wall and replace with wood-framed partition

HSS 5 1/2 x 5 1/2 x 3/8 Column Strongback

Classroom

Classroom

Classroom

Corridor

Unit Storage

Vault

Corridor

MECH/ELEC

Multi- Purpose Training

Men TLT/Shower

Women TLT/ Shower

Janitor

Recruiting Office

Lobby

Table & Chair Storage

Fitness

Multi - Purpose Trainings

Kitchen

Dril Hall

Open Office

Confrence

Telcom

Chair Lift

UP

Hall

Office

Office

Admin

Office

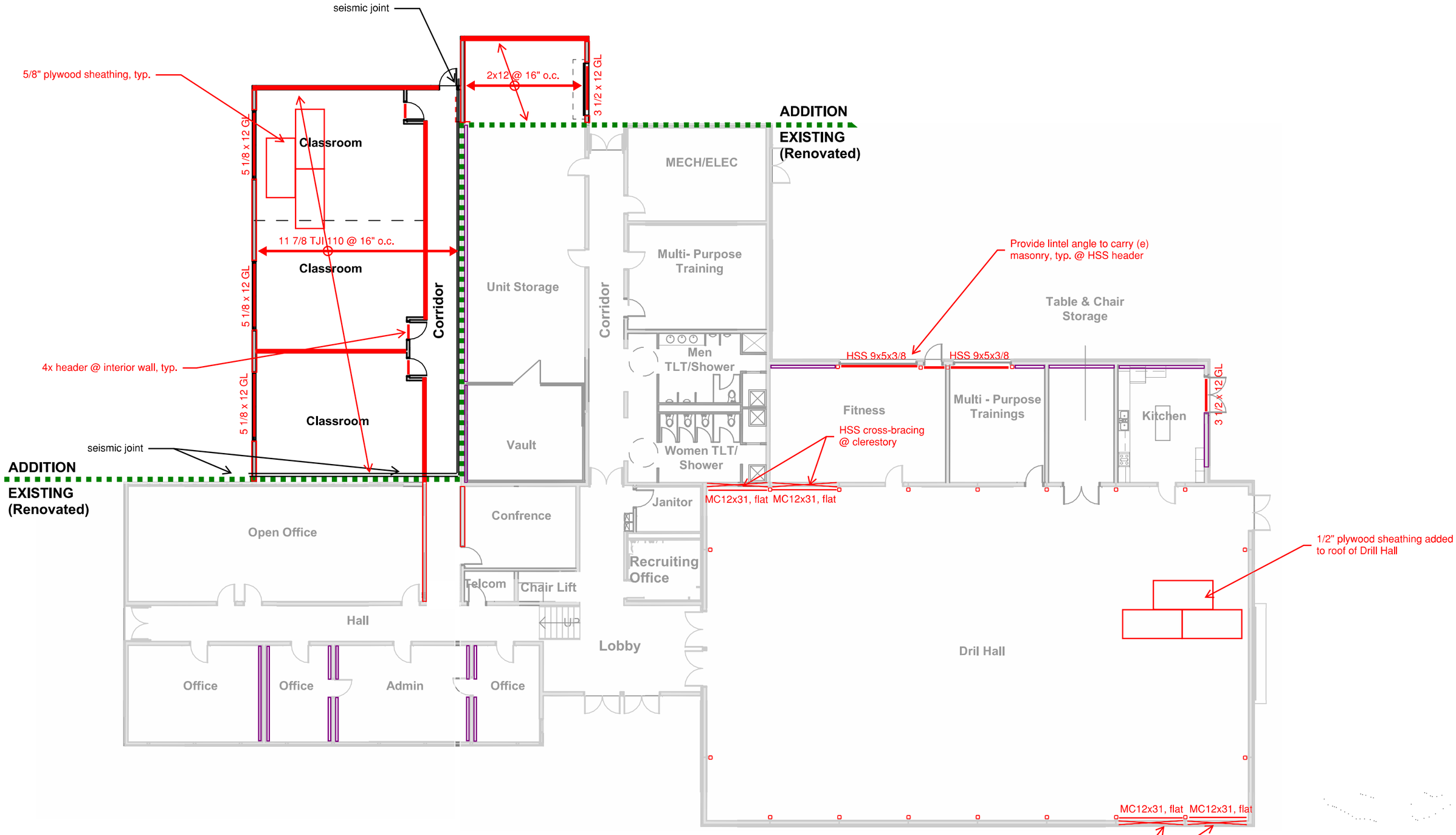
Anacortes Readiness Center

08/06/20

FLOOR PLAN (Proposed)

ARCHITECTS

SCHREIBER STARLING WHITEHEAD



Anacortes Readiness Center

ROOF PLAN (Proposed)

08/06/20

ARCHITECTS
SCHREIBER
STARLING
WHITEHEAD

APPENDIX B – ASCE 41-17 SEISMIC EVALUATION REPORT

Army National Guard – Anacortes Readiness Center
ASCE 41-13 Tier 1 Seismic Evaluation

2219 M Ave, Anacortes, WA 98221

August 7, 2020

LUND OPSAHL

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This structural study of Anacortes Readiness Center includes evaluation of 1962 reinforced masonry structure for adequacy over an additional 75-year life-span. This evaluation includes proposed structural remediation work required to reduce life-safety risks to the standards of the International Existing Building Code (IEBC), as anticipated to be adopted by the state of Washington by the time of permitting for the necessary work.

The planned program requirements for the upgrade and continued use of this building are expected to require a level of retrofit that will result in an International Existing Building Code classification of Substantial Alteration. Proposed upgrades to the existing structure consist of provision of diaphragm reinforcement and drag struts to collect and deliver forces to the existing lateral system, installation of floor-to-wall and roof-to-wall ties, and provision of additional steel members to strengthen existing steel columns.

The Readiness Center is classified as an essential facility, and all new work for the proposed addition will be required to meet current International Building Code standards for buildings of that category. In lieu of joining the addition to the existing structure and evaluating the entire building as a "new" structure, we propose to maintain a structural separation between the new addition and the existing structure, and to analyze the existing structure under the Targeted Building Performance Levels for Immediate Occupancy (1-B) as defined in the ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings. To evaluate the existing building's ability to meet these reduced performance objectives, the ASCE 41 requires a Tier 1 Assessment to be conducted using seismic response parameters defined as type BSE-1E.

INTRODUCTION

The seismic evaluation of Anacortes Readiness Center follows the recommendations of the *ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings,* which is the national standard for the seismic evaluation of existing structures. Additional information about the methodology is included in Appendix A of this report. The purpose of an assessment under this code is to determine the risk to human life posed by damage or failure of primary structure and architectural elements in a major earthquake. Anacortes Readiness Center has been evaluated in a manner consistent with an Immediate-Occupancy level of building performance, with the goal that the structure remains safe to occupy post-earthquake and essentially retains its pre-earthquake strength and stiffness. In interpreting the results, engineering judgment based on experience with similar structures has been applied.

OVERVIEW OF ASSESSMENT

The primary factor considered in this review is seismic safety. Many of the structures constructed in the early 20th century do not have the capacity to resist the earthquake ground motions that we now know are possible in Anacortes. Modern building codes have improved the structural detailing of buildings to reduce the risk of damage that could injure occupants in an earthquake, and a review of the original drawings indicates a lack of seismic detailing as required by more recent building codes. Consequently, we expect this building to perform poorly in a major earthquake. The table below is a quick summary of the condition and risk of the existing building.

Building Name	Sq Footage	Year Constructed	Stories	Construction Types	ASCE 41-17 Type	Life-Safety Risk	Comments
Anacortes Readiness Center	14,965	1962	1	Reinforced masonry structure with wood framed roof diaphragm and concrete wall foundations	RM1	High	insufficient floor-to-wall and roof-to-wall anchorage, insufficient diaphragm shear transfer capacity at wood ledger/masonry wall interface, inadequate steel T columns

Life-Safety Risk is categorized as follows:

- Low means that there is little expectation for building damage that would pose a life-threatening risk for occupants. Low also refers to buildings with low number of occupants, such as greenhouses.
- Moderate indicates that building damage is expected in a major earthquake. Falling objects, such as interior finishes and equipment may become a hazard to the occupants. Also, there is potential for portions of the structure to settle or collapse.
- High means that, in addition to the items listed above, partial building collapse may occur in a major earthquake with a high risk to life-safety.

Life-Safety risk categories and required remediation are determined for each building based on the following criteria:

- Number of deficiencies discovered using the ASCE 41-17 Tier 1 methodology
- Engineering judgment of the extent of building damage due to the type of deficiency listed
- Size and age of the structure as it equates to the number of occupants at risk
- Feasibility of quick exiting during an earthquake

This study also considers the existing condition and capacity of the gravity framing to support the self-weight of the building as well as modern snow loads. Consequently, we evaluated the capacity of the existing gravity elements based on the available design drawings from 1962 and have identified the structural upgrades necessary to facilitate the reconfiguration of the building's interior.

SITE INVESTIGATION AND DOCUMENT REVIEW

We have reviewed the available original construction drawings by Don L. McKee Architect dated October 1962 for the general concept of the material details, connections, and configuration of the existing reinforced masonry walls and supporting concrete foundations.

In keeping with standard procedure, a site walk-through was conducted to observe the visible portions of the structure. However, for this assessment, we have not performed in-depth evaluation of the original design nor have we confirmed that the actual construction is consistent with the framing and details shown on the documents. Where drawings were not specific, obscured components of the structure could not be verified.

BUILDING DESCRIPTION AND ASSESSMENT OF DEFICIENCIES

Constructed in 1962, Anacortes Readiness Center, formerly Anacortes National Guard Armory, is a one-story reinforced masonry structure located in Anacortes, WA.

Overview

Building Location: 2219 M Avenue, Anacortes, WA

Date of Construction: Original, 1962

Occupancy Type: The current and proposed occupancy types include Assembly (A-3), Business (B), and Low Hazard Storage (S-2).

Seismic Response Parameters:

Site Class: D

Site Location: 48.504 N 122.617 W

Hazard Level: 2015 SBC Code Level Event

Short Period: Sd_s 0.981g

One Second: Sd_1 0.596g

Gravity Framing System

Primary gravity support for the building is provided by reinforced masonry walls. At locations with clearstory windows, such as the drill hall, the roof is supported by steel columns. The roof framing at the drill hall consists of glulam girders, and the roof framing at all other parts of the building consists of wood joists. The framing carries either 3" decking or ¾" sheathing that comprise the roof diaphragm. The roof is clad in built-up roofing.

The existing documents in indicate the concrete extensions of the masonry walls and spread footings under the steel columns at the drill hall distribute the weight of the structure at grade. A concrete slab-on-grade forms the floor of the building.

Our evaluation of the building's existing gravity framing system as designed and detailed in the original 1962 drawings indicates reinforced masonry walls and foundations are adequate for typical snow loading.

Lateral System

The lateral force resisting system at Anacortes Readiness Center consists of reinforced masonry shear walls. The wood sheathing and decking at the roof act as flexible diaphragms, distributing seismic story forces to the walls and integrating them into a collective lateral system. At parts of the building with clerestory windows, such as in the drill hall, cantilevered steel columns are used to transfer forces from the diaphragm to the masonry walls underneath.

Review of the existing documents and evaluation under the ASCE 41-17 Tier 1 Analysis Checklists for buildings of this type indicates that there are myriad lateral deficiencies. These include:

- Inadequate wall anchorage for out-of-plane forces
- Insufficient diaphragm shear transfer capacity at wood ledger/masonry wall interface
- Existing steel t-shaped columns in Drill Hall inadequate for out-of-plane forces
- Inadequate capacity of straight-sheathed diaphragm shear capacity in Drill Hall

NON-STRUCTURAL COMPONENTS AND UTILITIES

Significant damage and injury can occur in earthquakes due to non-structural items. Current building codes require anchorage of items such as tall shelving and mechanical units. At the time that the Anacortes Readiness Center building was constructed, this anchorage was not a construction standard. The following lists some of the typical components that often fail in earthquakes causing risk to life safety, exiting and building damage. This is especially a concern due to the potential for excessive settlements in a major seismic event:

- Hung ceilings, light fixtures, sprinklers need to have lateral bracing.
- Shelving and storage racks need to be anchored to the floor or walls.
- Mechanical and electrical units need to be bolted to floor or roof framing.

No remediation is included for these non-structural items. The varying level of renovation may require all new equipment that must be installed to current building code. At the time of upgrade, it is recommended that a review of non-structural component attachments is conducted.

GEOTECHNICAL EVALUATION

The analysis of this building is based on the assumed soil bearing capacity of 4,000 psf per the original construction drawings. Geotechnical exploration is recommended to confirm that the assumed capacity is accurate, the existing footings match the original 1962 drawings, and that the potential for liquefaction of the site due to a seismic event is of negligible concern.

REMEDIATION STRATEGY

The following recommendations are provided to increase the serviceable life of the building given the deficiencies noted above. In order, they are:

1. Inadequate wall anchorage for out-of-plane forces
    a. Provide horizontal tension ties between roof joists and exterior masonry walls
    b. Install steel strongbacks to reinforce the walls/piers for out-of-plane forces at all unreinforced interior partition walls
2. Insufficient diaphragm shear transfer capacity at wood ledger/masonry wall interface
    a. Provide additional epoxied anchors at ledger for shear force transfer
    b. Install cross-bracing in clerestory space of Drill Hall to transfer lateral forces from roof diaphragm down to existing masonry shear walls
    c. Provide additional blocking and nailing at existing roof diaphragms to transfer lateral forces into ledgers and existing masonry walls
3. Existing steel t-shaped columns in Drill Hall inadequate for out-of-plane forces
    a. Strongback existing columns with additional steel members increase capacity
4. Inadequate capacity of straight-sheathed diaphragm shear capacity in Drill Hall
    a. Provide additional ½ plywood sheathing above existing straight sheathing

REPORT LIMITATIONS

This report summarizes our evaluation; it gives brief suggestions for upgrading the existing structure for use with the revised programs for the purpose of preliminary cost estimates. The proposed structural repairs and retrofits are those expected to be needed to comply with the building code for existing buildings.

If further evaluation is needed for upgrading the structures or costing analysis, then more complete information of the buildings will be required. Field verification and destructive testing may be required to determine actual conditions. Opinions expressed herein may change given additional information and material testing.

This report is intended for use by Anacortes Readiness Center. The scope of services performed during the execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings and recommendations presented herein is at the sole risk of said user. This evaluation does not represent a warranty or guarantee on the part of Lund Opsahl LLC that other problems such as material decay do not exist. Lund Opsahl's professional services are performed using the degree of skill and care ordinarily exercised under similar circumstances by structural engineers

practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional opinions included in this report.

CONCLUSION

The general conclusions for this study are given in the top of the document under Executive Summary. Individual building comments are listed under Building Description and Assessment Deficiencies.

Cindy Liauw, EIT

Engineer

Jeremiah W. Bowles, PE, SE

Associate

APPENDIX A

Seismic Design Methodology

ASCE 41-17 Seismic Evaluation & Retrofit of Existing Buildings

Our seismic evaluation approach follows the recommendations outlined in ASCE 41-17 *Seismic Evaluation and Retrofit of Existing Buildings*, which is the accepted national standard for seismic evaluation and rehabilitation of existing structures. Our scope of work was limited to a structural evaluation of the vertical load (self-weight and occupancy) and lateral load (wind and seismic) carrying systems of the primary structure. This report represents our opinion based on our review of the original drawings, our on-site observations, and limited calculations. No finishes were removed to observe structure except removable ceiling panels. No in-situ testing of the structure was performed. Investigation of the non-structural components, such as interior partitions, architectural finishes, and decorative facades, etc. was not part of the scope of work.

The basis of the ASCE 41-17 methodology is a multi-tiered evaluation of existing buildings based on available information. The Tier 1 evaluation uses standardized checklists and short engineering calculations to screen potential earthquake performance against generalized acceptance criteria based on the need for a structure to provide either basic life-safety, or in the case of more critical uses, immediate occupancy. Further Tier 2 and 3 evaluations may be performed on the building to more closely determine the extent of potential deficiencies that are identified in the Tier 1 evaluation. Only a Tier 1 evaluation has been performed for this report.

Seismicity

The city of Anacortes is in a seismically active area. The buildings located in Anacortes have experienced minor ground motions numerous times in their lifetime, three of the largest include the 1965 Sea-Tac Earthquake, ground motions associated with the eruption of Mount St. Helens in 1980, and the 2001 Nisqually Earthquake. The strongest ground motion experienced on site was due to the 2001 Nisqually Earthquake and was recorded as an intensity of V on the Modified Mercalli Intensity scale. For a description of the different measurements of earthquakes and the design criteria used in evaluating the buildings, refer Earthquake Measurement Section below. While these ground motions were less than those that are considered in earthquake design and seismic evaluation standards, the buildings appear to have performed adequately.

Performance Objectives

When performing an evaluation with ASCE 41-17, performance objectives are selected for structural components. The target building performance level then dictates what level of seismic forces the facility will be evaluated by and the safety factors used when evaluating component capacities. Figure 1 displays a breakdown of the target building performance levels. Our ASCE 41-17 Tier 1 checklist evaluation has been performed using BSE-1E seismic force criteria.

We have evaluated the structure for a Immediate Occupancy performance level (S-1). The structural components were evaluated using a performance level of S-1,

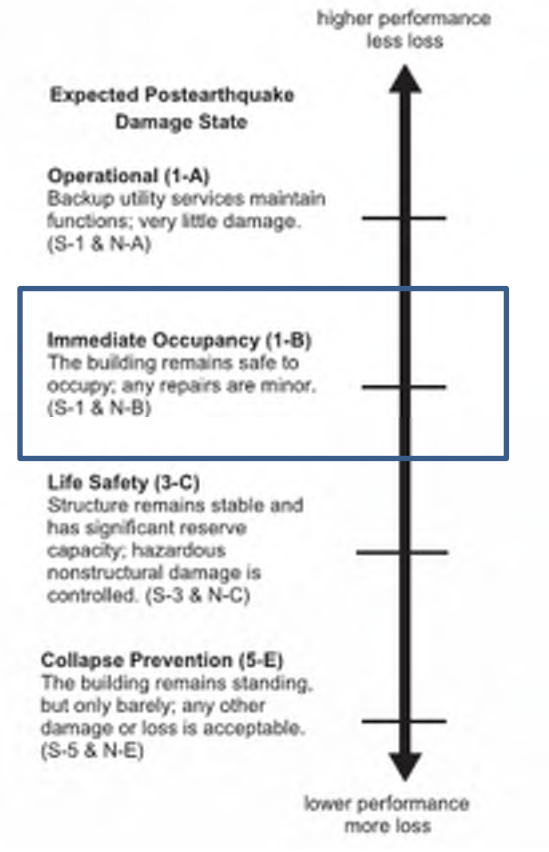


Figure 1: Target Building Performance Level

which means a structure remains safe to occupy and essentially retains its pre-earthquake strength and stiffness.

Earthquake Measurements and Seismic Performance

Earthquake magnitudes are a measure of the energy released by an earthquake and are measured by the Richter Magnitude Scale. The Richter scale, measured on a seismograph, records the magnitude of an earthquake as the amplitude (height) of the earthquake trace created by the pens of the seismograph on a logarithmic scaled chart. The Richter Scale is not a measurement of the damage caused by an earthquake. Damage to structures and effect on humans are an outcome of the intensity of the ground shaking. Intensity is dependent not only on the energy released by the earthquake but the distance from the epicenter to the building and the type of soils at the site. This intensity is commonly referred to on a standard called the Modified Mercalli Intensity (MMI) Scale. This scale tends to describe the damage levels and human perceptions more appropriately than the magnitude scale. An intensity of "I" is not felt but an intensity of "X" indicates severe ground motions and heavy damage to structures. In general, the MMI is greater near the epicenter of the earthquake and decreases with distance. Refer to the figure below for a very generalized correlation between the Richter Magnitude Scale and the MMI Scale.

The calculations performed for existing building reviews are based on guidelines that define the maximum considered earthquake as one that has a 2% probability of exceedance in 50 years and is dependent on the building's site class. A site class is a classification assigned to a site based on the types of soils present and their engineering properties. The preliminary calculations performed for a Tier 1 analysis assumes a site class. If geotechnical reports are available for nearby sites this helps to determine the site classification. We acquired data from the National Earthquake Hazard Reduction Program (NEHRP) spectral response acceleration contour map for short-period spectral acceleration and 1-second period accelerations to determine the intensity of potential earthquake energy at the site. In general, a design spectral response acceleration on the order of 0.65g-1.25g, a range for western Washington State, equates to an intensity of approximately X on the MMI scale, as shown in the attached Figure 2, and an equivalent 7.0 magnitude on the Richter scale.

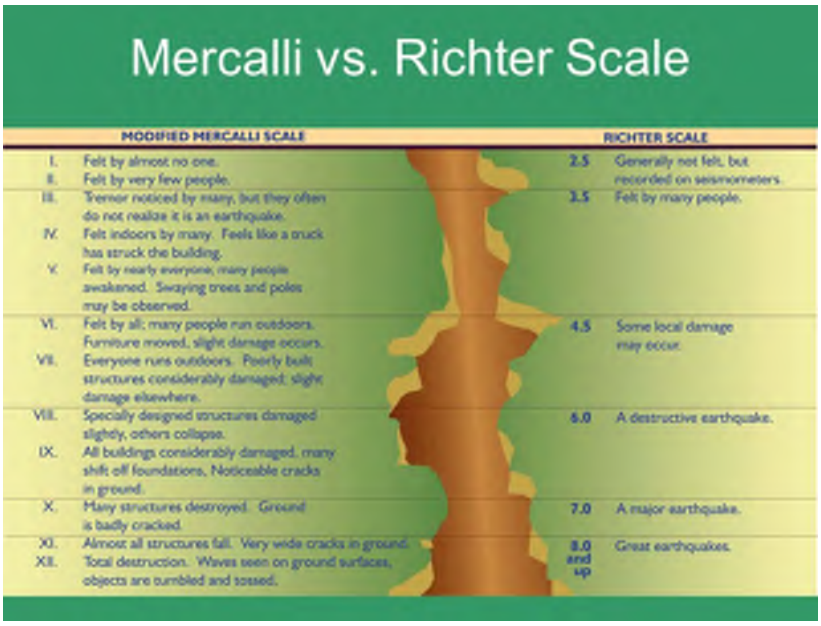


Figure 2 - Modified Mercalli Intensity Scale vs Ricter Magnitude Scale

APPENDIX B

ASCE 41-17 Checklists and Tier 1 Calculations

Project: Anacortes Readiness Center Location: 2219 M Avenue, Anacortes, WA
Completed by: CL

APPENDIX B
SUMMARY DATA SHEET

BUILDING DATA

Building Name:	Anacortes Readiness Center				Date:	7-Aug
Building Address:	2219 M Avenue, Anacortes, WA					
Latitude:	48.504	Longitude:	-122.617		By:	
Year Built:	1962	Year(s) Remodeled:		Original Design Code:		
Area (sf):	14,965	Length (ft):	196	Width (ft):	122	
No. of Stories	1	Story Height:	Varies	Total Height:	23	

USE	Industrial	Office	Warehouse	Hospital	Residential	Educational	Other

CONSTRUCTION DATA

Gravity Load Structural System:	Reinforced Masonry Bearing Walls with Flexible Diaphragms		
Exterior Transverse Walls:	Reinforced Masonry Bearing Walls	Openings?	windows, doors
Exterior Longitudinal Walls:	Reinforced Masonry Bearing Walls	Openings?	windows, doors
Roof Materials/Framing:	Straight wood decking on wood joists with built-up roofing		
Intermediate Floors/Framing:	N/A		
Ground Floor:	4" slab on grade, 5" slab on grade at drill hall		
Columns:	Steel columns	Foundation:	concrete spread footings and walls
General Condition of Structure:	good		
Levels Below Grade?	N/A		
Special Features and Comments:			

LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	Wood Diaphragm on RM Shear Walls	Wood Diaphragm on RM Shear Walls
Vertical Elements:	Reinforced Masonry Brick Shear Walls	Reinforced Masonry Brick Shear Walls
Diaphragms:	Wood Decking/Sheathing	Wood Decking/Sheathing
Connections:	little to none observed	little to none observed

EVALUATION DATA

BSE-2N Spectral Response Accelerations:	S_{DS}=	1.181	S_{D1}=	0.758		
Soil Factors	Class=	D	F_a=	1.05	F_v=	1.901
BSE-2E Spectral Response Accelerations	S_{XS}=	0.981	S_{X1}=	0.596		
Level of Seismicity:	High		Performance Level:	Immediate Occupancy		
Building Period:	T=	0.21				
Spectral Acceleration:	S_a=	0.98			Long	Transv
Modification Factor:	$C_m C_1 C_2$=	1.0	Building Weight: W (kip)=		922	922
Psuedo Lateral Force:			V=	$C_m C_1 C_2 S_a W$ (kip)=	904	904

BUILDING CLASSIFICATION	RM1

Project: Anacortes Readiness Center Location: 2219 M Avenue, Anacortes, WA
Completed by: CL

APPENDIX B
SUMMARY DATA SHEET (cont.)

REQUIRED TIER 1 CHECKLISTS (Table 4-7):

Building Type & Perf Level (Tbl 3-1):	RM1	Yes	No
Very Low Seismicity (Sec. 16.1.1)			x
Basic Configuration (Sec. 16.1.2)		x	
Life Safety Building-Type (Sec. 16.2LS-16.15LS)			x
Immediate Occupancy Building-Type (Sec. 16.2LS-16.15LS)		x	
Life Safety Nonstructural (16.17)			x
Position Retention Nonstructural (16.17)		x	

FURTHER EVALUATION REQUIREMENT:

Project: Anacortes Readiness Center Location: 2219 M Avenue, Anacortes, WA
Completed by: CL

16.1.2IO IMMEDIATE OCCUPANCY BASIC CONFIGURATION CHECKLIST

Very Low Seismicity
Building System

C, NC, N/A, U	*General*	Comments
C	LOAD PATH: The structure shall contain a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1)	
C	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 4% of the height of the shorter building. This statement need not apply for the following building types: W1, W1a, and W2. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2)	
N/A	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Commentary: Sec. A.2.1.3. Tier 2: Sec. 5.4.1.3)	

C, NC, N/A, U	*Building Configuration*	Comments
N/A	WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction shall not be less than 80% of the strength in the adjacent story above. (Commentary: Sec. A.2.2.2. Tier 2: Sec. 5.4.2.1)	
N/A	SOFT STORY: The stiffness of the seismic-force-resisting system in any story shall not be less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic- force-resisting system stiffnessof the three stories above. (Commentary: Sec. A.2.2.3. Tier 2: Sec. 5.4.2.2)	
C	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Commentary: Sec. A.2.2.4. Tier 2: Sec. 5.4.2.3)	
N/A	GEOMETRY: There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines. (Commentary: Sec. A.2.2.5. Tier 2: Sec. 5.4.2.4)	
N/A	MASS: There is no change in effective mass more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Commentary: Sec. A.2.2.6. Tier 2: Sec. 5.4.2.5)	
C	TORSION: The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension. (Commentary: Sec. A.2.2.7. Tier 2: Sec. 5.4.2.6)	

Project: Anacortes Readiness Center Location: 2219 M Avenue, Anacortes, WA
Completed by: CL

Low Seismicity: Complete the Following Items in Additionto the Items for Very Low Seismicity.

Geologic Site Hazards

C, NC, N/A, U		Comments
N/A	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance shall not exist in the foundation soils at depths within 50 ft under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1)	
N/A	SLOPE FAILURE: The building site is sufficiently remote from potential earthquake-induced slope failures or rockfalls to be unaffected by such failures or is capable of accommodating any predicted movements without failure. (Commentary: Sec. A.6.1.2. Tier 2: 5.4.3.1)	
N/A	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Commentary: Sec. A.6.1.3. Tier 2: 5.4.3.1)	

Moderate and High Seismicity: Complete the Following Items in Addition to the Items for Low Seismicity.

Foundation Configuration

C, NC, N/A, U		Comments
C	OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than 0.6S. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3)	
N/A	TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Commentary: Sec. A.6.2.2. Tier 2: Sec. 5.4.3.4)	

16.15IO IMMEDIATE OCCUPANCY STRUCTURAL CHECKLIST FOR BUILDING TYPES RM1: REINFORCED MASONRY BEARING WALLS AND RM1A: REINFORCED MASONRY BEARING WALLS WITH STIFF DIAPHRAGMS

Very Low Seismicity

Seismic-Force-Resisting System

C, NC, N/A, U		Comments
C	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)	
C	SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than 70 lb/in.2 (Commentary: Sec. A.3.2.4.1. Tier 2: Sec. 5.5.3.1.1)	
C	REINFORCING STEEL: The total vertical and horizontal reinforcing steel ratio in reinforced masonry walls is greater than 0.002 of the wall with the minimum of 0.0007 in either of the two directions; the spacing of reinforcing steel is less than 48 in., and all vertical bars extend to the top of the walls. (Commentary: Sec.A.3.2.4.2. Tier 2: Sec. 5.5.3.1.3)	

Connections

C, NC, N/A, U		Comments
NC	WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Commentary: Sec. A.5.1.2. Tier 2: Sec. 5.7.1.3)	
NC	TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls, and the connections are able to develop the lesser of the shear strength of the walls or diaphragms. (Commentary: Sec. A.5.2.1. Tier 2: Sec. 5.7.2)	Connections exist but is not illustrated clearly in existing drawings, could not be observed, and does not appear to have the required capacity
C	FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation, and the dowels are able to develop the lesser of the strength of the walls or the uplift capacity of the foundation. (Commentary: Sec.A.5.3.5. Tier 2: Sec. 5.7.3.4)	
C	GIRDER--COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)	
NC	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections shall have adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec.5.7.1.1)	Some connection shown but appears to be inadequate

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Stiff Diaphragms

C, NC, N/A, U		Comments
N/A	TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Commentary: Sec. A.4.5.1. Tier 2: Sec. 5.6.4)	
N/A	TOPPING SLAB TO WALLS OR FRAMES: Reinforced concrete topping slabs that interconnect the precast concrete diaphragm elements are doweled for transfer of forces into the shear wall or frame elements. (Commentary: Sec. A.5.2.3. Tier 2: Sec. 5.7.2)	

Foundation System

C, NC, N/A, U		Comments
N/A	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
C	SLOPING SITES: The difference in foundation embedment depth from one side of the building to another shall not exceed one story high. (Commentary: Sec. A.6.2.4)	

Low, Moderate, and High Seismicity: Complete the Following Items in Addition to the Items for Very Low Seismicity.

Seismic-Force-Resisting System

C, NC, N/A, U		Comments
C	REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Commentary: Sec. A.3.2.4.3. Tier 2: Sec. 5.5.3.1.5)	
C	PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30. (Commentary: Sec. A.3.2.4.4. Tier 2: Sec. 5.5.3.1.2)	

Diaphragms (Stiff or Flexible)

C, NC, N/A, U		Comments
C	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Commentary: Sec. A.4.1.4. Tier 2: Sec. 5.6.1.3)	
C	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft long. (Commentary: Sec. A.4.1.6. Tier 2: Sec. 5.6.1.3)	
NC	PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Commentary: Sec. A.4.1.7. Tier 2: Sec. 5.6.1.4)	Reentrant corners reinforcement not present but likely not necessary due to significant shear walls in all directions
N/A	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5)	

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Flexible Diaphragms

C, NC, N/A, U		Comments
NC	CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)	
C	STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)	
NC	SPANS: All wood diaphragms with spans greater than 12 ft consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)	
NC	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft and aspect ratios less than or equal to 3-to-1. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)	Span greater than 30 ft but aspect ratios are less than or equal to 3 to 1
N/A	NONCONCRETE FILLED DIAPHRAGMS: Untopped metal deck diaphragms or metal deck diaphragms with fill other than concrete consist of horizontal spans of less than 40 ft and have aspect ratios less than 4-to-1. (Commentary: Sec. A.4.3.1. Tier 2: Sec. 5.6.3)	
C	OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)	

Connections

C, NC, N/A, U		Comments
NC	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. before engagement of the anchors. (Commentary: Sec. A.5.1.4. Tier 2: Sec. 5.7.1.2)	

16.17 NONSTRUCTURAL CHECKLIST

Life Safety Systems

C, NC, N/A, U		Comments
N/A	LS-LMH; PR-LMH. FIRE SUPPRESSION PIPING: Fire suppression piping is anchored and braced in accordance with NFPA-13. (Commentary: Sec. A.7.13.1. Tier 2: Sec. I 5.7.4)	
N/A	LS-LMH; PR-LMH. FLEXIBLE COUPLINGS: Fire suppression piping has flexible couplings in accordance with NFPA-13. (Commentary: Sec. A.7.13.2. Tier 2: Sec. 13.7.4)	
N/A	LS-LMH; PR-LMH. EMERGENCY POWER: Equipment used to power or control life safety systems is anchored or braced. (Commentary: Sec. A.7.12.1. Tier 2: Sec. 13.7.7)	
N/A	LS-LMH; PR-LMH. STAIR AND SMOKE DUCTS: Stair pressui4zation and smoke control ducts are braced and have flexible connections at seismic joints. (Commentary: Sec. A.7.14.1. Tier 2: Sec. I 3.7.6)	
N/A	LS-MH; PR-MH. SPRINKLER CEILING CLEARANCE: Penetrations through panelized ceilings for fire suppression devices provide clearances in accordance with NFPA-13. (Commentary: Sec. A.7. 13.3. Tier 2: Sec. 13.7.4)	
U	LS-not required; PR-LMH. EMERGENCY LIGHTING: Emergency and egress lighting equipment is anchored or braced. (Commentary: Sec. A.7.3.1. Tier 2: Sec. 15.7.9)	

Hazardous Materials

C, NC, N/A, U		Comments
N/A	LS-LMH; PR-LMH. HAZARDOUS MATERIAL EQUIPMENT: Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers. (Commentary: Sec. A.7.12.2. Tier 2: 13.7.1)	
N/A	LS-LMH; PR-LMH. HAZARDOUS MATERIAL STORAGE: Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shell lips, wires, or other methods. (Commentary: Sec. A.7.15.1. Tier 2: Sec. 13.8.4)	
N/A	LS-MH; PR-MH. HAZARDOUS MATERIAL DISTRIBUTION: Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release. (Commentary: Sec. A.7.13.4. Tier 2: Sec. 13.7.3 and 13.7.5)	
N/A	LS-MH; PR-MH. SHUT-OFF VALVES: Piping containing hazardous material, including natural gas, has shut- off valves or other devices to limit spills or lacks. (Commentary: Sec. A.7.13.5. Tier 2: Sec. 13.7.5 and 13.7.5)	
N/A	LS-LMH; PR-LMH. FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, has flexible couplings. (Commentary: Sec. A.7.15.4, Tier 2: Sec.13.7.3 and 13.7.5)	

N/A	LS-MH; PR-MH. PIPING OR DUCTS CROSSING SEISMIC JOINTS: Piping or ductwork carrying hazardous material that either crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A.7.13.6. Tier 2: Sec.13.7.3, I 5.7.5, and 13.7.6)	

Partitions

C, NC, N/A, U		Comments
NC	LS-LMH; PR-LMH. UNREINFORCED MASONRY: Unreinforced masonry or hollow-clay tile partitions are braced at a spacing of at most 10 ft in Low or Moderate Seismicity, or at most 6 ft in High Seismicity. (Commentary: Sec. A.7.1.1. Tier 2: Sec. 15.6.2)	
N/A	LS-not required; PR-MH. LIGHT PARTITIONS SUPPORTED BY CEILINGS: The tops of gypsum board partitions are not laterally supported by an integrated ceiling system. (Commentary: Sec. A.7.2.1. Tier 2: Sec. 13.6.2)	
N/A	LS-not required; PR-MH. STRUCTURAL SEPARATIONS: Partitions that cross structural separations have seismic or control joints. (Commentary: Sec. A.7.1.3. Tier 2. Sec. 13.6.2)	
N/A	LS-not required; PR-MH. TOPS: The tops of ceiling-high framed or panelized partitions have lateral bracing to the structure at a spacing equal to or less than 6 ft. (Commentary: Sec. A.7. 1.4. Tier 2. Sec. 15.6.2)	

Ceilings

C, NC, N/A, U		Comments
NC	LS-MH; PR-LMH. SUSPENDED LATH AND PLASTER: Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 ft' of area. (Commentary: Sec. A.7.2.5. Tier 2: Sec. 13.6.4)	Plaster ceiling in a few locations
N/A	LS-MH; PR-LMH. SUSPENDED GYPSUM BOARD: Suspended gypsums board ceilings have attachments that resist seismic forces for every 12 ft' of area. (Commentary: Sec. A.7.2.3. Tier 2: Sec. 13.6.4)	
U	LS-neat required; PR-MH. INTEGRATED CEILINGS: Integrated suspended ceilings with continuous areas greater than 144 ft', and ceilings of smaller areas that are not surrounded by restraining partitions, are laterally restrained at a spacing no greater than 12 ft with members attached to the structure above. Each restraint location has a minimum of four diagonal wires and compression struts, or diagonal members capable of resisting compression. (Commentary: Sec. A.7.2.2. Tier 2: Sec. 15.6.4)	

U	LS-not required; PR-MH. EDGE CLEARANCE: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft' have clearances from the enclosing wall or partition of at least the following: in Moderate Seismicity, 1/2 in.; in High Seismicity, 3/4 in. (Commentary: Sec. A.7.2.4 Tier 2: Sec 13.6.4)	
N/A	LS-not required; PR-MH. CONTINUITY ACROSS STRUCTURE JOINTS: The ceiling system does not cross any seismic joint and is not attached to multiple independent structures. (Commentary: Sec. A.7.2.5. Tier 2: Sec. 13.6.4)	
NC	LS-not required; PR-H. EDGE SUPPORT: The *tsec edges* of integrated suspended ceilings with continuous areas greater than 144 ft2 are supported by closure angles or channels not less than 2 in. wide. (Commentary: Sec. A.7.2.6. Tier 2: Sec. 13.5.4)	
N/A	LS-not required; PR-H. SEISMIC JOINTS: Acoustical tile or lay-in panel ceilings have seismic separation joints such that each continuous portion of the ceiling is no more than 2500 ft' and has a ratio of long-to-short dimension no more than 4-tra-1. (Commentary: Sec. A.7.2.7. Tier 2: 13.6.4)	

Light Fixtures

C, NC, N/A, U		Comments
N/A	LS-MH; PR-MH. INDEPENDENT SUPPORT: Light fixtures that weigh more per square foot than the ceiling they penetrate are supported independent of the grid ceiling suspension system by a minimum *of* two wires at diagonally opposite corners of each fixture. (Commentary: Sec. A.7.3.2. Tier 2: Sec. 13.6.4 and 13.7.9)	
C	LS-not required; PR-H. PENDANT SUPPORTS: Light fixtures on pendant supports are attached at a spacing equal to or less than 6 ft and, if rigidly supported, are free to move with the structure to which they are attached without damaging adjoining components. (Commentary: A.7.3.3. Tier 2: Sec. 13.7.9)	
U	LS-not required; PR-H. LENS COVERS: Lens covers on light fixtures are attached with safety devices. (Commentary: Sec. A.7.3.4. Tier 2: Sec. 15.7.9)	

Cladding and Glazing

C, NC, N/A, U		Comments
N/A	LS-MH; PR-MH. CLADDING ANCHORS: Cladding components weighing more than 10 lb/ft' are mechanically anchored to the structure at a spacing equal to or less than the following: for Life Safety in Moderate Seismicity, 6 lt; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 ft. (Commentary: Sec. A.7.4.1. Tier 2: Sec. 15.6.1)	

N/A	LS-MH; PR-MH. CLADDING ISOLATION: For steel or concrete moment frame buildings, panel connections are detailed to accommodate a story drift ratio of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02. (Commentary: Sec. A.7.4.5. Tier 2: Section 13.6.1)	
N/A	LS-MH; PR-MH. MULTI-STORY PANELS: For multi-story panels attached at more than one floor level, panel connections are detailed to accommodate a story drift ratio of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02. (Commentary: Sec. A.7.4.4. Tier 2: Sec. 15.6.1)	
N/A	LS-MH; PR-MH. PANEL CONNECTIONS: Cladding panels are anchored out-of-plane with a minimum number of connections for each wall panel, as follows: for Life Safety in Moderate Seismicity, 2 connections; *too* Life Safety in High Seismicity and for Position Retention in any seismicity, 4 connections. (Commentary: Sec. A.7.4.5. Tier 2: Sec. 13.6.1.4)	
N/A	LS-MH; PR-MH. BEARING CONNECTIONS: Where bearing connections are used, there is a minimum *of* two bearing connections for each cladding panel. (Commentary: Sec. A.7.4.6. Tier 2: Sec. 15.6.1.4)	
N/A	LS-MH; PR-MH. INSERTS: Where concrete cladding components use inserts, the inserts have positive anchorage or are anchored to reinforcing steel. (Commentary: Sec. A.7.4.7. Tier 2: Sec. 13.6.1.4)	
N/A	LS-MH; PR-MH. OVERHEAD GLAZING: Glazing panes of any size in curtain walls and individual interior or exterior panes over 15 ft' in area are laminated annealed or laminated heat-strengthened glass and are detailed to remain in the frame when cracked. (Commentary: Sec. A.7.4.5: Tier 2: Sec. 1.3.6.1.5)	

Masonry Veneer

C, NC, N/A, U		Comments
NC	LS-LMH; PR-CMH. TIES: Masonry veneer is connected to the backup with corrosion-resistant ties. There is a minimum of one tie for every 2-2/3 ft', and the ties have spacing no greater than the following: *toe* Life Safety in Low or Moderate Seismicity, 36 in.; for Life Safety in High Seismicity and for Position Retention in any seismicity, 24 in. (Commentary: Sec. A.7.5. 1. Tier 2: Sec. 13.6.1.2)	
N/A	LS-LMH; PR-LMH. SHELF ANGLES: Masonry veneer is supported by shelf angles or other elements at each floor above the ground floor. (Commentary: Sec. A.7.5.2. Tier 2: Sec. 13.6.1.2)	
U	LS-LMH; PR-LMH. WEAKENED PLANES: Masonry veneer is anchored to the backup adjacent to weakened planes, such as at the locations of flashing. (Commentary: Sec. A.7.5.3. Tier 2: Sec. 13.6.1.2)	

C	LS-LMH; PR-LMH. UNREINFORCED MASONRY BACKUP: There is no unreinforced masonry backup. (Commentary: Sec. A.7.7.2. Tier 2: Section 13.6.1.1 and 13.6.1.2)	
N/A	LS-MH; PR-MH. STUD TRACKS: For veneer with metal stud backup, stud tracks are fastened to the structure at a spacing equal to or less than 24 in. on center. (Commentary: Sec. A.7.6.1. Tier 2: Section 13.6.1.1 and 13.5.1.2)	
U	LS-MH; PR-MH. ANCHORAGE: For veneer with concrete block or masonry backup, the backup is positively anchored to the structure at a horizontal spacing equal to or less than 4 ft along the floors and roof. (Commentary: Sec. A.7.7.1. Tier 2: Section 13.6.1.1 and 13.6.1.2)	
N/A	LS-not required; PR-MH. WEEP HOLES: In veneer anchored to stud walls, the veneer has functioning weep holes and base flashing. (Commentary: Sec. A.7.5.6. Tier 2: Section 13.6.1.2)	
N/A	LS-not required; PR-MH. OPENINGS: For veneer with metal stud backup, steel studs frame window and door openings. (Commentary: Sec. A.7.6.2. Tier 2: Sec. 13.6.1.1 and 13.6.1.2)	

Parapets, Cornices, Ornamentation, and Appendages

C, NC, N/A, U		Comments
N/A	LS-LMH; PR-LMH. URM PARAPETS OR CORNICES: Laterally unsupported unreinforced masonry parapets or cornices have height-to-thickness ratios no greater than the following: for Life Safety in Low or Moderate Seismicity, 2.5; for Life Safety in High Seismicity and for Position Retention in any seismicity, 1.5. (Commentary: Sec. A.7.6. 1. Tier 2: Sec. 15.6.5)	
N/A	LS-LMH; PR-LMH. CANOPIES: Canopies at building exits are anchored to the structure at a spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 10 *ft, toe* Life Safety in High Seismicity and for Position Retention in any seismicity, 6 ft. (Commentary: Sec. A.7.5.2. Tier 2: Sec. 13.6.6)	
N/A	LS-MH; PR-LMH. CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement. (Commentary: Sec. A.7.5.3. Tier 2: Sec. 13.6.5)	
U	LS-MH; PR-LMH. APPENDAGES: Cornices, parapets, signs, and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are reinforced and anchored to the structural system at a spacing equal to or less than 5 ft. This checklist item does not apply to parapets or cornices covered by other checklist items. (Commentary: Sec. A.7.5.4. Tier 2: Sec. 13.6.6)	

Masonry Chimneys

C, NC, N/A, U		Comments
N/A	LS-LMH; PR-LMH. URM CHIMNEYS: Unreinforced masonry chimneys extend above the roof surface no more than the following: for Life Safety in Low or Moderate Seismicity, 3 times the least dimension o1 the chimney; for Life Safety in High Seismicity and for Position Retention in any seismicity, 2 times the least dimension of the chimney. (Commentary: Sec. A.7.9. 1. Tier 2: 13.6.7)	
N/A	LS-LMH; PR-LMH. ANCHORAGE: Masonry chimneys are anchored at each floor level, at the topmost ceiling level, and at the roof. (Commentary: Sec. A.7.9.2. Tier 2: I 3.6.7)	

Stairs

C, NC, N/A, U		Comments
N/A	LS-LMH; PR-LMH. STAIR ENCLOSURES: Hollow-clay tile or unreinforced masonry walls around stair enclosures are restrained out-of-plane and have height-to-thickness ratios not greater than the following: for Life Safety in Low or Moderate Seismicity, 15-to-1; for Life Safety in High Seismicity and for Position Retention in any seismicity, 12-to-1. (Commentary: Sec. A.7.10.1. Tier 2: Sec. 13.6.2 and 13.6.8)	
N/A	LS-LMH; PR—CMH. STAIR DETAILS: In moment frame structures, the connection between the stairs and the structure does not rely on shallow anchors in concrete. Alternatively, the stair details are capable of accommodating the drift calculated using the Quick Check procedure of Section 4.5.3. 1 without including any lateral stiffness contribution from the stairs. (Commentary: Sec. A.7. 10.2. Tier 2: 13.6.5)	

Contents and Furnishings

C, NC, N/A, U		Comments
N/A	LS-MH; PR-MH. INDUSTRIAL STORAGE RACKS: Industrial storage racks or pallet racks more than 12 ft high meet the requirements of ANSI/MH 16.1 as modified by ASCE 7 Chapter 15. (Commentary: Sec. A.7.11.1. Tier 2: Sec. 13.8.1)	
N/A	LS-H; PR-MH. TALL NARROW CONTENTS: Contents more than 6 ft high with a height-to-depth or height- to-width ratio greater than 3-to-1 are anchored to the structure or to each other. (Commentary: Sec. A.7.11.2. Tier 2: Sec. 13.6.2)	
N/A	LS-H; PR-H. FALL-PRONE CONTENTS: Equipment, stored items, oi other contents weighing more than	
N/A	20 lb whose center of mass is more than 4 ft above the adjacent floor level are braced or otherwise restrained. (Commentary: Sec. A.7.11.3. Tier 2: Sec. 13.8.2)	
N/A	LS-not required; PR-MH. ACCESS FLOORS: Access floors more than 9 in. high are braced. (Commentary: Sec. A.7.11.4. Tier 2: Sec. 13.8.5)	

N/A	LS-not required; PR-MH. EQUIPMENT ON ACCESS FLOORS: Equipment and other contents supported by access floor systems are anchored or braced to the structure independent of the access floor. (Commentary: Sec. A.7.11.5. Tier 2: Sec. 13.7.7 and 13.5.5)	
N/A	LS-not required; PR-H. SUSPENDED CONTENTS: Items suspended without lateral bracing are free to swing from or move with the structure from which they are suspended without damaging themselves or adjoining components. (Commentary. A.7.11.6. Tier 2: Sec. 15.5.2)	

Mechanical and Electrical Equipment

C, NC, N/A, U		Comments
U	LS-H; PR-H. FALL-PRONE EQUIPMENT: Equipment weighing more than 20 lb whose center of mass is more than 4 ft above the adjacent floor level, and which is not in-line equipment, is braced. (Commentary: A.7. 12.4. Tier 2: 13.7.1 and 13.7.7)	
U	LS-H; PR-H. IN-LINE EQUIPMENT: Equipment installed in-line with a duct or piping system, with an operating weight more than 75 lb, is supported and laterally braced independent of the duct or piping system. (Commentary: Sec. A.7.12.5. Tier 2: Sec. 13.7.1)	
U	LS-H; PR-MH. TALL NARROW EQUIPMENT: Equipment more than 6 ft high with a height-to-depth or height-to-width ratio greater than 3-to-1 is anchored to the floor slab or adjacent structural walls. (Commentary: Sec. A.7.12.6. Tier 2: Sec. 13.7.1 and 13.7.7)	
N/A	LS-not required; PR-MH. MECHANICAL DOORS: Mechanically operated doors are detailed to operate at a story drift ratio of 0.01. (Commentary: Sec. A.7. 12.7. Tier 2: Sec. 13.6.9)	
C	LS-not required; PR-H. SUSPENDED EQUIPMENT: Equipment suspended without lateral bracing is free to swing from or move with the structure from which it is suspended without damaging itself or adjoining components. (Commentary: Sec. A.7. 12.5. Tier 2: Sec. 15.7.1 and 13.7.7)	
N/A	LS-not required; PR-H. VIBRATION ISOLATORS: Equipment mounted on vibration isolators is equipped with horizontal restraints or snubbers and with vertical restraints to resist overturning. (Commentary: Sec. A.7.12.9. Tier 2: Sec. 13.7.1)	
N/A	LS-not required; PR-H. HEAVY EQUIPMENT: Floor-supported or platform-supported equipment weighing more than 400 lb is anchored to the structure. (Commentary: Sec. A.7.12.10. Tier 2: 13.7.1 and 13.7.7)	
C	LS-not required; PR-H. ELECTRICAL EQUIPMENT: Electrical equipment is laterally braced to the structure. (Commentary: Sec. A.7.12. 11. Tier 2: 13.7.7)	

U	LS-not required; PR-H. CONDUIT COUPLINGS: Conduit greater than 2.5 in. trade size that is attached to panels, cabinets, or other equipment and is subject to relative seismic displacement has flexible couplings or connections. (Commentary: Sec. A.7.12. 12. Tier 2: 13.7.5)	
NC	LS-not required; PR-H. FLEXIBLE COUPLINGS: Fluid and gas piping has flexible couplings. (Commentary: Sec. A.7.13.2. Tier 2: Sec. 15.7.3 and 15.7.5)	
NC	LS-not required; PR-H. FLUID AND GAS PIPING: Fluid and gas piping is anchored and braced to the structure to limit spills or leaks. (Commentary: Sec. A.7.13.4. Tier 2: Sec. 15.7.3 and 13.7.5)	
U	LS-not required; PR-H. C-CLAMPS: One-sided C-clamps that support piping larger than 2.5 in. in diameter are restrained. (Commentary: Sec. A.7.13.5. Tier 2: Sec. 15.7.3 and 13.7.5)	
N/A	LS-not required; PR-H. PIPING CROSSING SEISMIC JOINTS: Piping that crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A7.13.5. Tier 2: Sec.13.7.5 and Sec. 13.7.5)	

Ducts

C, NC, N/A, U		Comments
U	LS-not required; PR-H. DUCT BRACING: Rectangular ductwork larger than 6 ft² in cross-sectional area and round ducts larger than 25 in. in diameter are braced. The maximum spacing of transverse bracing does not exceed 30 ft. The maximum spacing of longitudinal bracing does not exceed 60 ft. (Commentary: Sec. A.7. 14.2. Tier 2: Sec. 13.7.6)	
U	LS-not required; PR-H. DUCT SUPPORT: Ducts are not supported by piping or electrical conduit. (Commentary: Sec. A.7.14.3. Tier 2: Sec. 13.7.6)	
N/A	LS-not required; PR-H. DUCTS CROSSING SEISMIC JOINTS: Ducts that cross seismic joints or isolation planes or are connected to independent structures have couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A.7.14.5. Tier 2: Sec. 13.7.6)	

Elevators

C, NC, N/A, U		Comments
N/A	LS-H; PR-H. RETAINER GUARDS: Sheaves and drums have cable retainer guards. (Commentary: Sec. A.7.16.1. Tier 2: 13.5.6)	
N/A	LS-H; PR-H. RETAINER PLATE: A retainer plate is present at the top and bottom of both car and counterweight. (Commentary: Sec. A.7. 16.2. Tier 2: 13.8.6)	

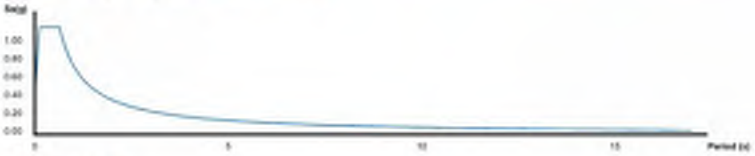
N/A	LS—not required; PR—H. ELEVATOR EQUIPMENT: Equipment, piping, and other components that are part of the elevator system are anchored. (Commentary: Sec. A.7.16.3. Tier 2: 13.5.6)	
N/A	LS-not required; PR-H. SEISMIC SWITCH: Elevators capable *of* operating at speeds of 150 ft/min or faster are equipped with seismic switches that meet the requirements of ASME A17.1 or have trigger levels set to 209c of the acceleration of gravity at the base of the structure and 509c*of* the acceleration of gravity in other locations. (Commentary: Sec. A.7.16.4. Tier 2: 13.8.6)	
N/A	LS-not required; PR-H. SHAFT WALLS: Elevator shaft walls are anchored and reinforced to prevent toppling into the shaft during strong shaking. (Commentary: Sec. A.7.16.5. Tier 2: 13.8.6)	
N/A	LS-not required; PR-H. COUNTERWEIGHT RAILS: All counterweight rails and divider beams are sized in accordance with ASME A17.1. (Commentary: Sec. A.7.16.6. Tier 2: 13.5.6)	
N/A	LS-not required; PR-H. BRACKETS: The brackets that tie the car rails and the counterweight rail to the structure are sized in accordance with ASME A17.1. (Commentary: Sec. A.7.16.7. Tier 2: 13.5.6)	
N/A	LS-not required; PR-H. SPREADER BRACKET: Spreader brackets are not used to resist seismic forces. (Commentary: Sec. A.7.16.5. Tier 2: 13.5.6)	
N/A	LS-not required; PR-H. GO-SLOW ELEVATORS: The building has a go-slow elevator system. (Commentary: Sec. A.7.16.9. Tier 2: 13.8.6)	

ATC Hazards by Location

Search Information

Address:	Anacortes, WA 98221, USA
Coordinates:	48.5136041000000N, -122.6728719
Elevation:	19 ft
Timestamp:	2020-08-11T12:29:11.526Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Site Class:	D
Custom Probability:	

Horizontal Response Spectrum - Hazard Level BSE-2N



Hazard Level BSE-2N

Name	Value	Description
S_{aUH}	1.237	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
CR_0	0.909	Coefficient of risk (0.2s)
S_{aRT}	1.104	Probabilistic risk-targeted ground motion (0.2s)
S_{aD}	1.5	Factored deterministic acceleration value (0.2s)
S_S	1.104	MCE_R ground motion (period=0.2s)
F_a	1.05	Site amplification factor at 0.2s
S_{MS}	1.161	Site modified spectral response (0.2s)
$S1_{UH}$	0.448	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
CR_1	0.89	Coefficient of risk (1.0s)
$S1_{RT}$	0.399	Probabilistic risk-targeted ground motion (1.0s)
$S1_D$	0.6	Factored deterministic acceleration value (1.0s)
S_1	0.399	MCE_R ground motion (period=1.0s)
F_v	1.901	Site amplification factor at 1.0s
S_{M1}	0.758	Site modified spectral response (1.0s)

Hazard Level BSE-1N

Name	Value	Description
S_{MS}	0.797	Site modified spectral response (0.2s)
S_{M1}	0.536	Site modified spectral response (1.0s)

Hazard Level BSE-2E

Name	Value	Description
S_S	0.944	MCE_R ground motion (period=0.2s)
F_a	1.162	Site amplification factor at 0.2s
S_{MS}	0.981	Site modified spectral response (0.2s)
S_1	0.297	MCE_R ground motion (period=1.0s)
F_v	2.306	Site amplification factor at 1.0s
S_{M1}	0.596	Site modified spectral response (1.0s)

Hazard Level BSE-1E

Name	Value	Description
S_S	0.403	MCE_R ground motion (period=0.2s)
F_a	1.478	Site amplification factor at 0.2s
S_{MS}	0.596	Site modified spectral response (0.2s)
S_1	0.129	MCE_R ground motion (period=1.0s)
F_v	2.343	Site amplification factor at 1.0s
S_{M1}	0.301	Site modified spectral response (1.0s)

T. Data

Building weight

Roof : Built up roofing = 6 psf
1" rigid insulation = 1.5 psf
3" T&G decking = 7.5 psf

Acoustical tile = 1 psf 2x12 joists @ 24" = 1.9 psf	Everywhere UNO Total = 17.9 psf
Plaster ceiling = 8 psf 2x12 joists @ 24" = 1.9 psf	Restrooms, kitchen, showers, boiler room) Total = 24.9 psf
5" conc slab = 80.4 psf 2x12 joists @ 24" = 1.9 psf	Vault Total = 97.3 psf
Drill hall framing = 5 psf	Total = 20 psf

Walls : 8" CMU = 81 psf
12" CMU = 123 psf
6" CMU = 54 psf

Roof weight

Drill hall : 5452 ft² x 20 psf = 109 040 lbs
Vault : 210 ft² x 77.3 psf = 16 233 lbs
Plaster ceiling : 1197 ft² x 24.9 psf = 29 805 lbs
Acoustical tile ceiling : 8106 ft² x 17.9 psf = 145 097 lbs
Misc : 5 psf x 14965 ft² = 74 825 lbs

Wall weight (half of wall weight incl. in seismic weight)

See attached, total weight = 547 381 lbs

Total weight = 922 381 lbs

Wall Weight Calculations

Wall no	H (ft)	L (ft)	t (in)	Weight (psf)	Weight (lbs)
1	9.00	17.00	8	81	6197
2	9.00	14.00	8	81	5103
3	9.00	17.66	6	59	4689
4	9.00	13.66	8	81	4979
5	13.75	20.50	8	81	11416
6	9.00	62.00	8	81	22599
7	9.00	6.00	8	81	2187
8	9.00	12.66	8	81	4615
9	9.00	37.00	8	81	13487
10	9.00	11.66	8	81	4250
11	9.00	7.00	8	81	2552
12	9.00	9.00	8	81	3281
13	13.75	25.50	8	81	14200
14	9.00	3.66	8	81	1334
15	9.00	30.50	8	81	11117
16	13.75	14.00	8	81	7796
17	15.67	21.30	12	123	20527
18	15.67	22.50	12	123	21683
19	15.67	13.00	12	123	12528
20	15.67	21.50	12	123	20720
21	15.67	95.00	12	123	91552
22	15.67	69.33	12	123	66814
23	15.67	12.66	12	123	12201
24	15.67	4.00	12	123	3855
25	9.00	10.33	8	81	3765
26	9.00	14.20	8	81	5176
27	9.00	15.00	8	81	5468
28	9.00	14.75	8	81	5376
29	9.00	5.00	8	81	1823
30	9.00	15.75	8	81	5741
31	9.00	24.00	8	81	8748
32	9.00	12.00	8	81	4374
33	13.75	13.50	8	81	7518
34	13.75	13.50	8	81	7518
35	9.00	21.00	8	81	7655
36	13.75	76.00	8	81	42323
37	9.00	19.00	8	81	6926
38	9.00	24.00	8	81	8748
39	9.00	24.00	8	81	8748
40	9.00	21.00	8	81	7655
41	9.00	21.00	8	81	7655
42	9.00	9.50	8	81	3463
43	9.00	8.50	8	81	3098
44	9.00	6.66	8	81	2428
45	9.00	6.66	8	81	2428
45	9.00	17.66	6	59	4689
46	9.00	17.66	6	59	4689
47	13.75	21.00	8	81	11694
				Total	**547381**

Torsion

Assume mass per building area is approx constant → center of mass is area centroid

Centroid location: x = 105' y = 50' (from bottom left grid)

See attached calculations for center of rigidity

$$\Delta = \frac{Ph^3}{3EI} + \frac{1.2Ph}{AG}$$

Assume P = 1 000 000 lbs

G = 0.4E for masonry E = 3 000 000 psi for masonry

$$\Delta = \frac{4P(h/L)^3}{Et} + \frac{3P(h/L)}{Et} = \frac{4(h/L)^3}{3t} + \frac{h/L}{t}$$

$R = 1/\Delta$

Center of rigidity location: $x = \frac{\Sigma xR_y}{\Sigma R_y} = \frac{17\,958}{219} = 78.5'$ $y = \frac{\Sigma yR_x}{\Sigma R_x} = \frac{19657}{342} = 57.5'$

Distance b/w center of mass and center of rigidity

x: $|105' - 78.5'| = 26.5' < 196' \times 20\% = 39.2'$ OK

y: $|50' - 57.5'| = 7.5' < 122' \times 20\% = 24.4'$ OK

Torsion OK

Overturning

$\frac{\text{Least horiz dimension}}{\text{building height}} = \frac{122'}{15.69'} = 7.79 > 0.6S_a = 0.6(0.98) = 0.588$ OK

Shear stress check

Shear in y direction: $A_w = 39\,824\ in^2$ $V_j^{avg} = \frac{1}{M_s}\left(\frac{V_j}{A_w}\right) = \frac{1}{1.5}\left(\frac{904\ k}{39\,824\ in^2}\right) = 22.70\ lb/in^2$ OK

Shear in x direction: $A_w = 61\,457\ in^2$ $V_j^{avg} = \frac{1}{M_s}\left(\frac{V_j}{A_w}\right) = \frac{1}{1.5}\left(\frac{904\ k}{61\,457\ in^2}\right) = 14.71\ lb/in^2$ OK

Reinforcing steel check

6" walls reinf: #4@48" vert → steel ratio = $0.2\ in^2/(6' \times 24') = 0.00138$

0.162 ea course → steel ratio = $0.02\ in^2 \times 2/(6" \times 8") = 0.00083$

Total steel ratio = 0.0022 > 0.002 OK

8" walls reinf: #4 @ 24" vert → steel ratio = $0.2\ in^2/(7\ 5/8" \times 24") = 0.00109$

3/16 ea course → steel ratio = $0.028\ in^2 \times 2/(7\ 5/8" \times 7\ 5/8") = 0.00096$

Total steel ratio = 0.0021 OK

12" walls reinf: (2) #4 @ 24" vert → $0.2\ in^2 \times 2/(12" \times 24") = 0.00139$

3/16 ea course → $0.028\ in^2 \times 2/(12" \times 8") = 0.00058$

Total steel ratio = 0.0020 OK

Wall Rigidity Calculations for Torsion Check

Wall no	H (ft)	L (ft)	x (ft)	y (ft)	H/L	t (in)	delta	R	kRy	yRx
1	9.00	17.00	0.00	-	0.53	8.00	0.09	11.00	0.00	-
2	9.00	14.00	0.00	-	0.64	8.00	0.12	8.02	0.00	-
3	9.00	17.66	36.00	-	0.51	6.00	0.11	8.75	314.82	-
4	9.00	13.66	72.00	-	0.66	8.00	0.13	7.69	553.74	-
5	13.75	20.50	78.50	-	0.67	8.00	0.13	7.46	585.24	-
6	9.00	62.00	58.33	-	0.15	8.00	0.02	53.61	3126.78	-
7	9.00	8.00	80.00	-	1.50	8.00	0.75	1.33	106.67	-
8	9.00	12.66	80.00	-	0.71	8.00	0.15	6.72	537.85	-
9	9.00	37.00	80.00	-	0.24	8.00	0.03	30.48	2438.72	-
10	9.00	11.66	86.00	-	0.77	8.00	0.17	5.78	496.74	-
11	9.00	7.00	86.00	-	1.29	8.00	0.51	1.94	167.01	-
12	9.00	9.00	86.00	-	1.00	8.00	0.29	3.43	294.86	-
13	13.75	25.50	86.00	-	0.54	8.00	0.09	10.69	919.47	-
14	9.00	3.66	110.00	-	2.46	8.00	2.75	0.36	39.49	-
15	9.00	30.50	110.00	-	0.30	8.00	0.04	24.29	2672.01	-
16	13.75	14.00	86.00	-	0.98	8.00	0.28	3.56	306.47	-
17	15.67	21.30	100.00	-	0.74	12.00	0.11	9.47	947.44	-
18	15.67	22.50	108.00	-	0.70	12.00	0.10	10.46	1046.25	-
19	15.67	13.00	196.00	-	1.21	12.00	0.30	3.39	664.31	-
20	15.67	21.50	136.00	-	0.73	12.00	0.10	9.64	1889.08	-
21	15.67	95.00	-	0.00	0.16	12.00	0.01	70.20	-	0.00
22	15.67	69.33	-	60.00	0.23	12.00	0.02	49.71	-	2982.41
23	15.67	12.66	-	60.00	1.24	12.00	0.31	3.19	-	191.18
24	15.67	4.00	-	60.00	3.92	12.00	7.01	0.14	-	8.56
25	9.00	10.33	-	32.00	0.87	8.00	0.22	4.56	-	146.03
26	9.00	14.20	-	32.00	0.63	8.00	0.12	8.22	-	263.03
27	9.00	15.00	-	32.00	0.60	8.00	0.11	9.01	-	288.29
28	9.00	14.75	-	32.00	0.61	8.00	0.11	8.76	-	280.37
29	9.00	5.00	-	32.00	1.80	8.00	1.20	0.84	-	26.73
30	9.00	15.75	-	38.00	0.57	8.00	0.10	9.75	-	370.64
31	9.00	24.00	-	38.00	0.38	8.00	0.05	17.96	-	682.67
32	9.00	12.00	-	38.00	0.75	8.00	0.16	6.19	-	231.63
33	13.75	13.50	-	38.00	1.02	8.00	0.30	3.30	-	125.24
34	13.75	13.50	-	60.00	1.02	8.00	0.30	3.30	-	197.75
35	9.00	21.00	-	60.00	0.43	8.00	0.07	14.99	-	899.67
36	13.75	76.00	-	81.00	0.18	8.00	0.02	42.37	-	3431.89
37	9.00	19.00	-	90.00	0.47	8.00	0.08	13.00	-	1169.98
38	9.00	24.00	-	104.00	0.38	8.00	0.06	17.96	-	1868.35
39	9.00	24.00	-	122.00	0.38	8.00	0.06	17.96	-	2191.72
40	9.00	21.00	-	122.00	0.43	8.00	0.07	14.99	-	1829.33
41	9.00	21.00	-	113.00	0.43	8.00	0.07	14.99	-	1694.38
42	9.00	9.50	-	102.00	0.95	8.00	0.26	3.84	-	392.11
43	9.00	8.50	-	107.00	1.06	8.00	0.33	3.03	-	308.91
44	9.00	6.66	-	22.00	1.35	8.00	0.58	1.72	-	37.92
45	9.00	6.66	-	22.00	1.35	8.00	0.58	1.72	-	37.92

Total Ry 218.08 Total xRy 17106.98

Total Rx 341.64 Total yRx 19656.70

Wall Area Calculations

Wall no	H (ft)	L (ft)	t (in)	Area (in2)		
1	9.00	17.00	8	1632		
2	9.00	14.00	8	1344		
3	9.00	17.66	6	1272		
4	9.00	13.66	8	1311		
5	13.75	20.50	8	1968		
6	9.00	62.00	8	5952		
7	9.00	6.00	8	576		
8	9.00	12.66	8	1215		
9	9.00	37.00	8	3552		
10	9.00	11.66	8	1119		
11	9.00	7.00	8	672		
12	9.00	9.00	8	864		
13	13.75	25.50	8	2448		
14	9.00	3.66	8	351		
15	9.00	30.50	8	2928		
16	13.75	14.00	8	1344		
17	15.67	21.30	12	3067		
18	15.67	22.50	12	3240		
19	15.67	13.00	12	1872		
20	15.67	21.50	12	3096	**Total area**	**39824**
21	15.67	95.00	12	13680		
22	15.67	69.33	12	9984		
23	15.67	12.66	12	1823		
24	15.67	4.00	12	576		
25	9.00	10.33	8	992		
26	9.00	14.20	8	1363		
27	9.00	15.00	8	1440		
28	9.00	14.75	8	1416		
29	9.00	5.00	8	480		
30	9.00	15.75	8	1512		
31	9.00	24.00	8	2304		
32	9.00	12.00	8	1152		
33	13.75	13.50	8	1296		
34	13.75	13.50	8	1296		
35	9.00	21.00	8	2016		
36	13.75	76.00	8	7296		
37	9.00	19.00	8	1824		
38	9.00	24.00	8	2304		
39	9.00	24.00	8	2304		
40	9.00	21.00	8	2016		
41	9.00	21.00	8	2016		
42	9.00	9.50	8	912		
43	9.00	8.50	8	816		
44	9.00	6.66	8	639		
45	9.00	6.66	8	639	**Total area**	**61457**

Foundation dowels

for general notes, dowels from ftg to wall of same size and spacing as vert reinf in the wall, lap 30d

Footing under 8" wall: uplift capacity = 145 pcf x 18" x 8" = 145 plf

Dowels provided #4 @ 24" → A_s = 0.1 in²/ft

Required lap splice length = $\frac{f_s \psi_t \psi_e}{20\lambda\sqrt{f'_c}} d_b = \frac{20\,(1)\,(1)}{25\sqrt{1125}} \times 0.5 = 12"$

Provided lap splice length = 30 x 0.5" = 15" > 12"

Dowel capacity = 20 ksi x 0.1 in²/ft = 2,000 plf OK

Footing under 12" wall: uplift capacity = 145 pcf x 26" x 10" = 262 plf

Dowels provided #4 @ 24" → A_s = 0.1 in²/ft

Dowel capacity = 20 ksi x 0.1 in²/ft = 2000 plf OK

Wall anchorage

$T_c = \Psi S_{xs} W_p A_p = 1.8(0.981)(81\ psf)(9\ ft^2) = 1287$ lbs at 9' tall walls

W_p = 81 psf (8" wall)

A_p = 9/2 x 24" = 9 ft²

Ψ = 1.8 (immediate occupancy)

S_{xs} = 0.981

T_c = 1.8(0.981)(81 psf)(13.75'/2 x 16") = 1311 lbs at 13.75' tall walls

Wall anchorage details unclear from available construction drawings and observation

Assume not compliant.

Check shear walls in hallway of left wing of building

Tributary weight = 21'-4" x 39' x 17.9 psf + (21'-4" + 39') x 2 x 9' x 81 psf = 176,444 lbs

V = S_a W = 0.98(176,444) = 172,915 lbs

$v_j^{avg} = \frac{1}{M_s}\left(\frac{V_i}{A_w}\right) = \frac{1}{1.5}\left(\frac{172{,}915}{(15.75 + 24 + 12) \times 12 \times 8}\right) = 23.2$ lbf/in² OK

Check gravity on roof

2x12 @ 24", Span = 21'-4", D = 18 psf, S = 25 psf, Select Structural Douglas fir-Larch

$M = \frac{(18\ psf + 25\ psf) \times 24" \times (21'-4")^2}{8} = 4891$ lb-ft

$f_b = \frac{6M}{bd^2} = \frac{6 \times 4891 \times 12}{1.5(11.25)^2} = 1855$ psi

F'_b = 1900 psi x 1.15 x 1.15 = 1984 psi > f_b OK

Check gravity on masonry wall

8" wall: (18+25) psf x 21'-4"/2 = 459 lb/ft → $\sigma = \frac{459\ lb/ft}{8"} = 4.8$ psi OK by inspection

12" wall: (18+25) psf x 60'/2 = 1350 lb/ft → $\sigma = \frac{1350\ lb/ft}{12"} = 9.4$ psi OK by inspection

Check footing

Under 8" wall : (459 lb/ft + 81 psf x 9') / 18" = 792 psf < 4000 psf, OK

Under 12" wall (1390 lb/ft + 123 psf x 19.67') / 20" = 1966 psf < 4000 psf, OK

Check tube column (assume HSS 4 x 4 x 5/16, F_y = 33 ksi)

Compression : D = 18 psf x 8' x 21'-4"/2 = 1.54 k
S = 25 psf x 8' x 21'-4"/2 = 2.13 k

Seismic : E = 81 psf x 8' x 0.98 x 0.7 = 445 plf

See attached calculations. Column is OK

Check Glulam beam

Trib width = 12' span = 60'

Loads : D = 20 psf x 12' = 240 plf
L = 28 psf x 12' = 300 plf

Glulam dimensions:
width = 9" Depth at ends = 1'-7¾" Depth at center = 3'-1⅜"

See attached calculations. Glulam beam is OK.

Check T column (ST 7 WF 21.5 → equivalent to WT7 x 21.5, F_y = 33 ksi)

Compression : D = 20 psf x 12' x 30' = 7.2 k
S = 25 psf x 12' x 30' = 9.0 k

Seismic : E = 123 psf x 12' x 0.98 = 1.45 k/ft

See attached calculations. Column is not OK

Project Title:
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Steel Column

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Description : Tube column

Code References

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS4x4x3/16**
Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 33.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 9.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Fully braced against buckling ABOUT Y-Y Axis
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 9.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 84.780 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 9.0 ft, D = 1.540, S = 2.130 k
BENDING LOADS . . .
Lat. Uniform Load creating My-y, E = 0.4450 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = 0.5420 : 1
Load Combination +D+0.70E+0.60H
Location of max.above base 4.530 ft
At maximum location values are . . .
Pa : Axial 1.625 k
Pn / Omega : Allowable 40.334 k
Ma-x : Applied 0.0 k-ft
Mn-x / Omega : Allowable 6.043 k-ft
Ma-y : Applied 3.154 k-ft
Mn-y / Omega : Allowable 6.043 k-ft

PASS Maximum Shear Stress Ratio = 0.09768 : 1
Load Combination +D+0.70E+0.60H
Location of max.above base 0.0 ft
At maximum location values are . . .
Va : Applied 1.402 k
Vn / Omega : Allowable 14.350 k

Maximum Load Reactions . .
Top along X-X 2.003 k
Bottom along X-X 2.003 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .
Along Y-Y 0.0 in at 0.0 ft above base
for load combination :
Along X-X 0.3687 in at 4.530 ft above base
for load combination : E Only

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.040	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+L+H	0.040	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+Lr+H	0.040	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+S+H	0.093	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.040	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.080	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+0.60W+H	0.040	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+0.750Lr+0.450W+H	0.040	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+0.750S+0.450W+H	0.080	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.024	PASS	0.00 ft	1.00	1.14	0.00	69.68	0.000	PASS	0.00 ft
+D+0.70E+0.60H	0.542	PASS	4.53 ft	1.00	1.14	0.00	69.68	0.098	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.431	PASS	4.47 ft	1.00	1.14	0.00	69.68	0.073	PASS	0.00 ft
+0.60D+0.70E+H	0.534	PASS	4.53 ft	1.00	1.14	0.00	69.68	0.098	PASS	0.00 ft

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Steel Column

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Description : Tube column

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments k-ft @ Base	@ Top	My - End Moments @ Base	@ Top
+D+H	1.625								
+D+L+H	1.625								
+D+Lr+H	1.625								
+D+S+H	3.755								
+D+0.750Lr+0.750L+H	1.625								
+D+0.750L+0.750S+H	3.222								
+D+0.60W+H	1.625								
+D+0.750Lr+0.450W+H	1.625								
+D+0.750S+0.450W+H	3.222								
+0.60D+0.60W+0.60H	0.975								
+D+0.70E+0.60H	1.625	-1.402	1.402						
+D+0.750L+0.750S+0.5250E+H	3.222	-1.051	1.051						
+0.60D+0.70E+H	0.975	-1.402	1.402						
D Only	1.625								
Lr Only									
L Only									
S Only	2.130								
W Only									
E Only		-2.003	2.003						
H Only									

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments k-ft @ Base	@ Top	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	3.755								
"	Minimum									
Reaction, X-X Axis Base	Maximum	1.625								
"	Minimum		-2.003	2.003						
Reaction, Y-Y Axis Base	Maximum	1.625								
"	Minimum	1.625								
Reaction, X-X Axis Top	Maximum		-2.003	2.003						
"	Minimum	1.625								
Reaction, Y-Y Axis Top	Maximum	1.625								
"	Minimum		-2.003	2.003						
Moment, X-X Axis Base	Maximum	1.625								
"	Minimum	1.625								
Moment, Y-Y Axis Base	Maximum	1.625								
"	Minimum	1.625								
Moment, X-X Axis Top	Maximum	1.625								
"	Minimum	1.625								
Moment, Y-Y Axis Top	Maximum	1.625								
"	Minimum	1.625								

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.450W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750S+0.450W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.70E+0.60H	0.2581	in	4.530	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	0.1936	in	4.530	ft	0.000	in	0.000	ft
+0.60D+0.70E+H	0.2581	in	4.530	ft	0.000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

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Steel Column

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Description : Tube column

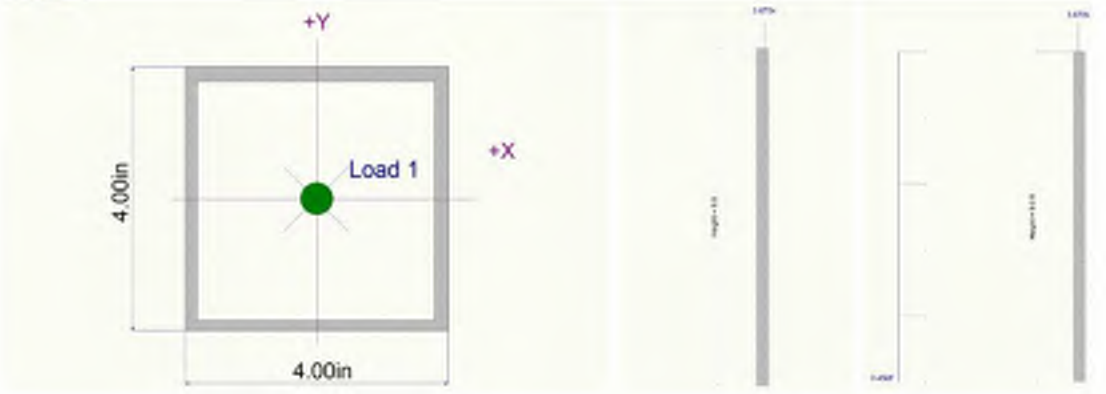
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
E Only	0.3687	in	4.530	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS4x4x3/16

Depth	=	4.000	in	I xx	=	6.21	in^4	J	= 10.000 in^4
Design Thick	=	0.174	in	S xx	=	3.10	in^3		
Width	=	4.000	in	R xx	=	1.550	in		
Wall Thick	=	0.187	in	Zx	=	3.670	in^3		
Area	=	2.580	in^2	I yy	=	6.210	in^4	C	= 5.070 in^3
Weight	=	9.420	plf	S yy	=	3.100	in^3		
				R yy	=	1.550	in		
Yog	=	0.000	in						

Sketches



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Wood Beam

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Description : GLULAM BEAM

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination ASCE 7-16

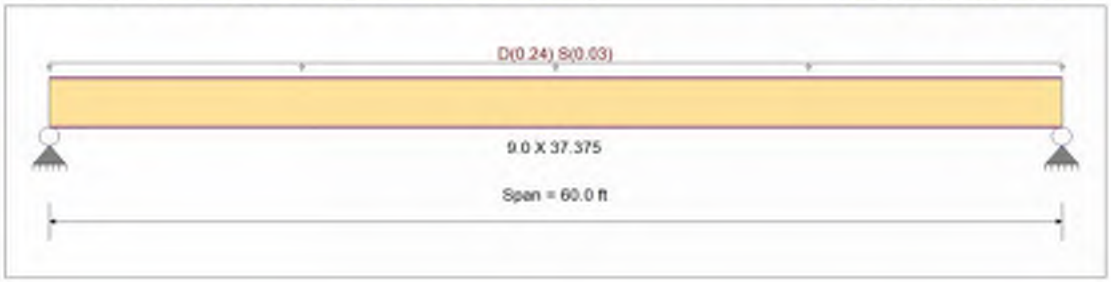
Wood Species : DF/HF
Wood Grade : 24F-V10

Fb +	2400 psi
Fb -	2400 psi
Fc - Prll	1550 psi
Fc - Perp	650 psi
Fv	215 psi
Ft	1150 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1500 ksi
Eminbend - yy	790 ksi
Density	26.84 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.240, S = 0.030 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.361 : 1	Maximum Shear Stress Ratio	=	0.188 : 1
Section used for this span		9.0 X 37.375	Section used for this span		9.0 X 37.375
fb : Actual	=	780.10 psi	fv : Actual	=	36.36 psi
FB : Allowable	=	2,160.00 psi	Fv : Allowable	=	193.50 psi
Load Combination		+D+H	Load Combination		+D+H
Location of maximum on span	=	30.000 ft	Location of maximum on span	=	56.934 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.125 in	Ratio =	5767 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	1.384 in	Ratio =	520 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	Fb	V	fv	Fv
+D+H													0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.361	0.188	0.90	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	2160.00	8.15	36.36	193.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.325	0.169	1.00	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	2400.00	8.15	36.36	215.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.260	0.135	1.25	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	3000.00	8.15	36.36	268.75
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.311	0.162	1.15	1.000	1.00	1.00	1.00	1.00	1.00	149.71	857.41	2760.00	8.96	39.96	247.25
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.260	0.135	1.25	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	3000.00	8.15	36.36	268.75

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Wood Beam

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Description : GLULAM BEAM

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	Fb	Shear Values V	fv	Fv
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.304	0.158	1.15	1.000	1.00	1.00	1.00	1.00	1.00	146.34	838.08	2760.00	8.76	39.06	247.25
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.203	0.106	1.60	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	3840.00	8.15	36.36	344.00
+D+0.750Lr+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.203	0.106	1.60	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	3840.00	8.15	36.36	344.00
+D+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.218	0.114	1.60	1.000	1.00	1.00	1.00	1.00	1.00	146.34	838.08	3840.00	8.76	39.06	344.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.122	0.063	1.60	1.000	1.00	1.00	1.00	1.00	1.00	81.73	468.06	3840.00	4.89	21.81	344.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.203	0.106	1.60	1.000	1.00	1.00	1.00	1.00	1.00	136.21	780.10	3840.00	8.15	36.36	344.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.218	0.114	1.60	1.000	1.00	1.00	1.00	1.00	1.00	146.34	838.08	3840.00	8.76	39.06	344.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 60.0 ft	1	0.122	0.063	1.60	1.000	1.00	1.00	1.00	1.00	1.00	81.73	468.06	3840.00	4.89	21.81	344.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	1.3845	30.219		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.981	9.981
Overall MINimum	0.900	0.900
+D+H	9.081	9.081
+D+L+H	9.081	9.081
+D+Lr+H	9.081	9.081
+D+S+H	9.981	9.981
+D+0.750Lr+0.750L+H	9.081	9.081
+D+0.750L+0.750S+H	9.756	9.756
+D+0.60W+H	9.081	9.081
+D+0.750Lr+0.450W+H	9.081	9.081
+D+0.750S+0.450W+H	9.756	9.756
+0.60D+0.60W+0.60H	5.449	5.449
+D+0.70E+0.60H	9.081	9.081
+D+0.750L+0.750S+0.5250E+H	9.756	9.756
+0.60D+0.70E+H	5.449	5.449
D Only	9.081	9.081
Lr Only		
L Only		
S Only	0.900	0.900
W Only		
E Only		
H Only		

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Steel Column

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Description : T column

Code References

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name :	WT7x21.5
Analysis Method :	Allowable Strength
Steel Stress Grade	
Fy : Steel Yield	33.0 ksi
E : Elastic Bending Modulus	29,000.0 ksi

Overall Column Height	19.0 ft
Top & Bottom Fixity	Top & Bottom Pinned

Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 3.33 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 19.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 408.50 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 19.0 ft, D = 7.20, S = 9.0 k
BENDING LOADS . . .
Lat. Uniform Load from 0.0-->15.670 ft creating Mx-x, E = 1.450 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

FAIL Max. Axial+Bending Stress Ratio = 6.629 : 1

Load Combination	+D+0.70E+0.60H
Location of max.above base	9.181 ft
At maximum location values are . . .	
Pa : Axial	7.609 k
Pn / Omega : Allowable	60.383 k
Ma-x : Applied	43.031 k-ft
Mn-x / Omega : Allowable	6.554 k-ft
Ma-y : Applied	0.0 k-ft
Mn-y / Omega : Allowable	0.0 k-ft

PASS Maximum Shear Stress Ratio = 0.3784 : 1

Load Combination	+D+0.70E+0.60H
Location of max.above base	0.0 ft
At maximum location values are . . .	
Va : Applied	9.346 k
Vn / Omega : Allowable	24.698 k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	9.370 k
Bottom along Y-Y	13.352 k

Maximum Load Deflections . . .

Along Y-Y 6.280 in at 9.436 ft above base
for load combination : E Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.126	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+L+H	0.126	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+Lr+H	0.126	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+S+H	0.275	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.126	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.238	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+0.60W+H	0.126	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+0.750Lr+0.450W+H	0.126	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+0.750S+0.450W+H	0.238	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.076	PASS	0.00 ft	1.15	1.00	69.68	69.68	0.000	PASS	0.00 ft
+D+0.70E+0.60H	6.629	FAIL !	9.18 ft	1.15	1.00	69.68	69.68	0.378	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	4.615	FAIL !	9.18 ft	1.15	1.00	69.68	69.68	0.284	PASS	0.00 ft
+0.60D+0.70E+H	6.604	FAIL !	9.18 ft	1.15	1.00	69.68	69.68	0.378	PASS	0.00 ft

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

File = C:\Users\claus\DOCUME~1\ENERCA~1\20-090-01 Anacortes Readiness Center.ec6 :
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Description : T column

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
+D+H	7.609										
+D+L+H	7.609										
+D+Lr+H	7.609										
+D+S+H	16.609										
+D+0.750Lr+0.750L+H	7.609										
+D+0.750L+0.750S+H	14.359										
+D+0.60W+H	7.609										
+D+0.750Lr+0.450W+H	7.609										
+D+0.750S+0.450W+H	14.359										
+0.60D+0.60W+0.60H	4.565										
+D+0.70E+0.60H	7.609				9.346	6.559					
+D+0.750L+0.750S+0.5250E+H	14.359				7.010	4.919					
+0.60D+0.70E+H	4.565				9.346	6.559					
D Only	7.609										
Lr Only											
L Only											
S Only	9.000										
W Only											
E Only					13.352	9.370					
H Only											

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	16.609										
"	Minimum											
Reaction, X-X Axis Base	Maximum	7.609										
"	Minimum	7.609										
Reaction, Y-Y Axis Base	Maximum					13.352	9.370					
"	Minimum	7.609										
Reaction, X-X Axis Top	Maximum	7.609										
"	Minimum	7.609										
Reaction, Y-Y Axis Top	Maximum	7.609										
"	Minimum	7.609										
Moment, X-X Axis Base	Maximum	7.609										
"	Minimum	7.609										
Moment, Y-Y Axis Base	Maximum	7.609										
"	Minimum	7.609										
Moment, X-X Axis Top	Maximum	7.609										
"	Minimum	7.609										
Moment, Y-Y Axis Top	Maximum	7.609										
"	Minimum	7.609										

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.450W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750S+0.450W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.70E+0.60H	0.0000	in	0.000	ft	4.396	in	9.436	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	3.297	in	9.436	ft
+0.60D+0.70E+H	0.0000	in	0.000	ft	4.396	in	9.436	ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

File = C:\Users\claus\DOCUME~1\ENERCA~1\20-090-01 Anacortes Readiness Center.ec6
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Description : T column

Maximum Deflections for Load Combinations

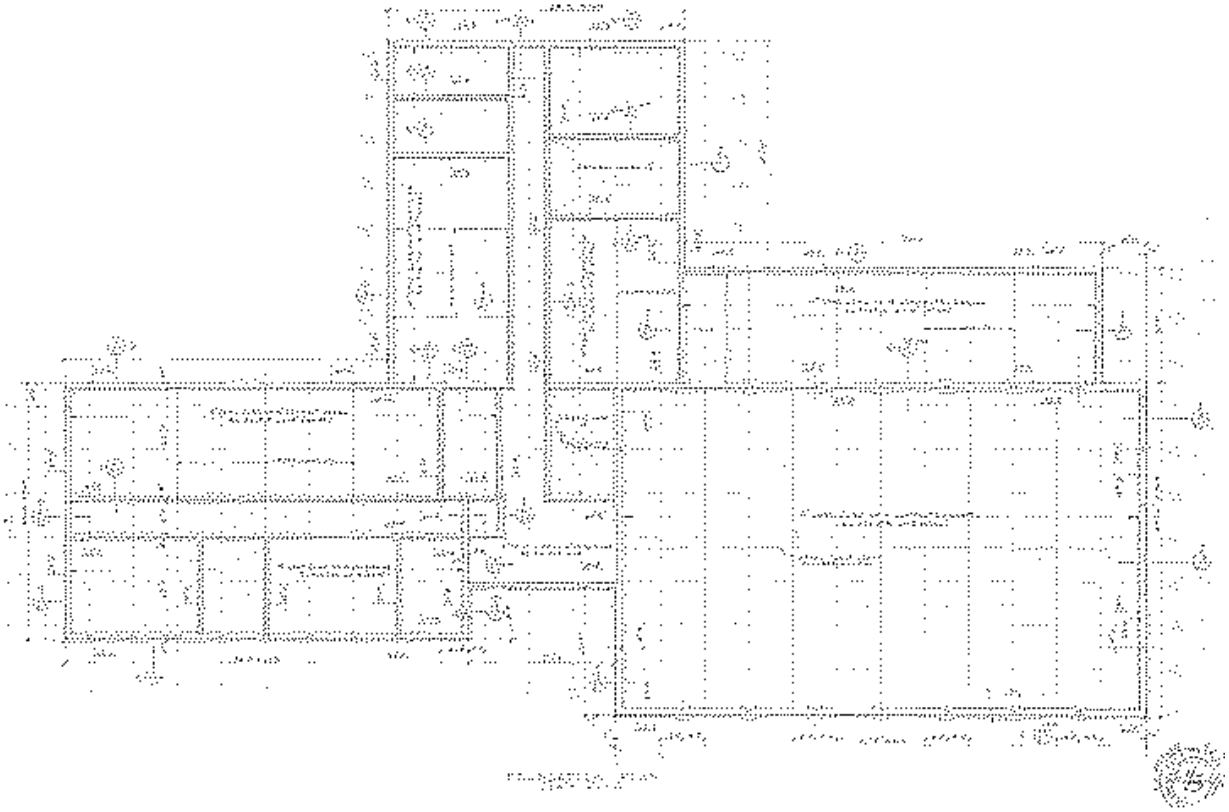
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
E Only	0.0000	in	0.000	ft	6.280	in	9.436	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

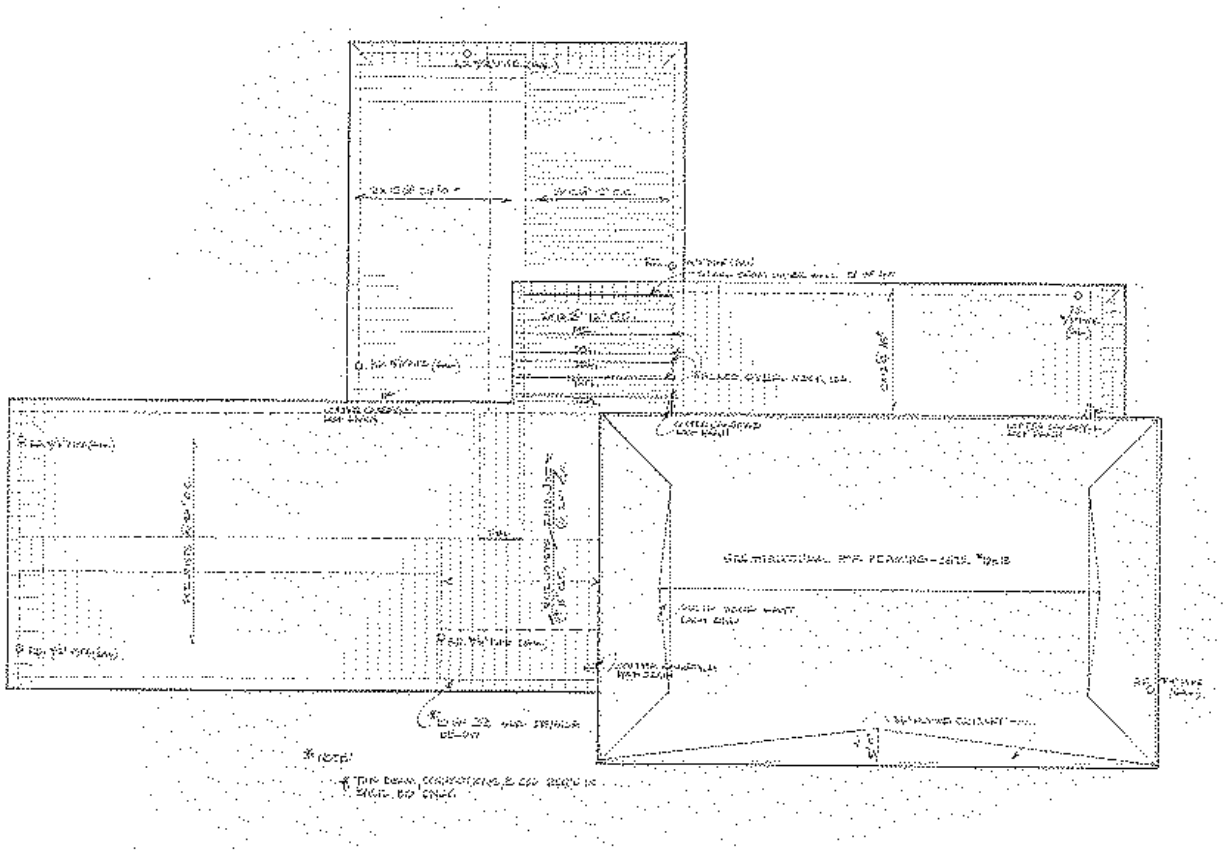
Steel Section Properties : WT7x21.5

Depth	=	6.830 in	I xx	=	21.90 in^4	J	=	0.522 in^4
Web Thick	=	0.305 in	S xx	=	3.98 in^3	Cw	=	0.75 in^6
Flange Width	=	8.000 in	R xx	=	1.860 in	Ro	=	2.860 in
Flange Thick	=	0.530 in	Zx	=	7.050 in^3	H	=	0.865 in
Area	=	6.310 in^2	I yy	=	22.600 in^4			
Weight	=	21.500 plf	S yy	=	5.650 in^3			
Kdesign	=	1.120 in	R yy	=	1.890 in			
			Zy	=	8.640 in^3			
Ycg	=	1.310 in	Qs	=	0.773			
Yp	=	0.394 in						

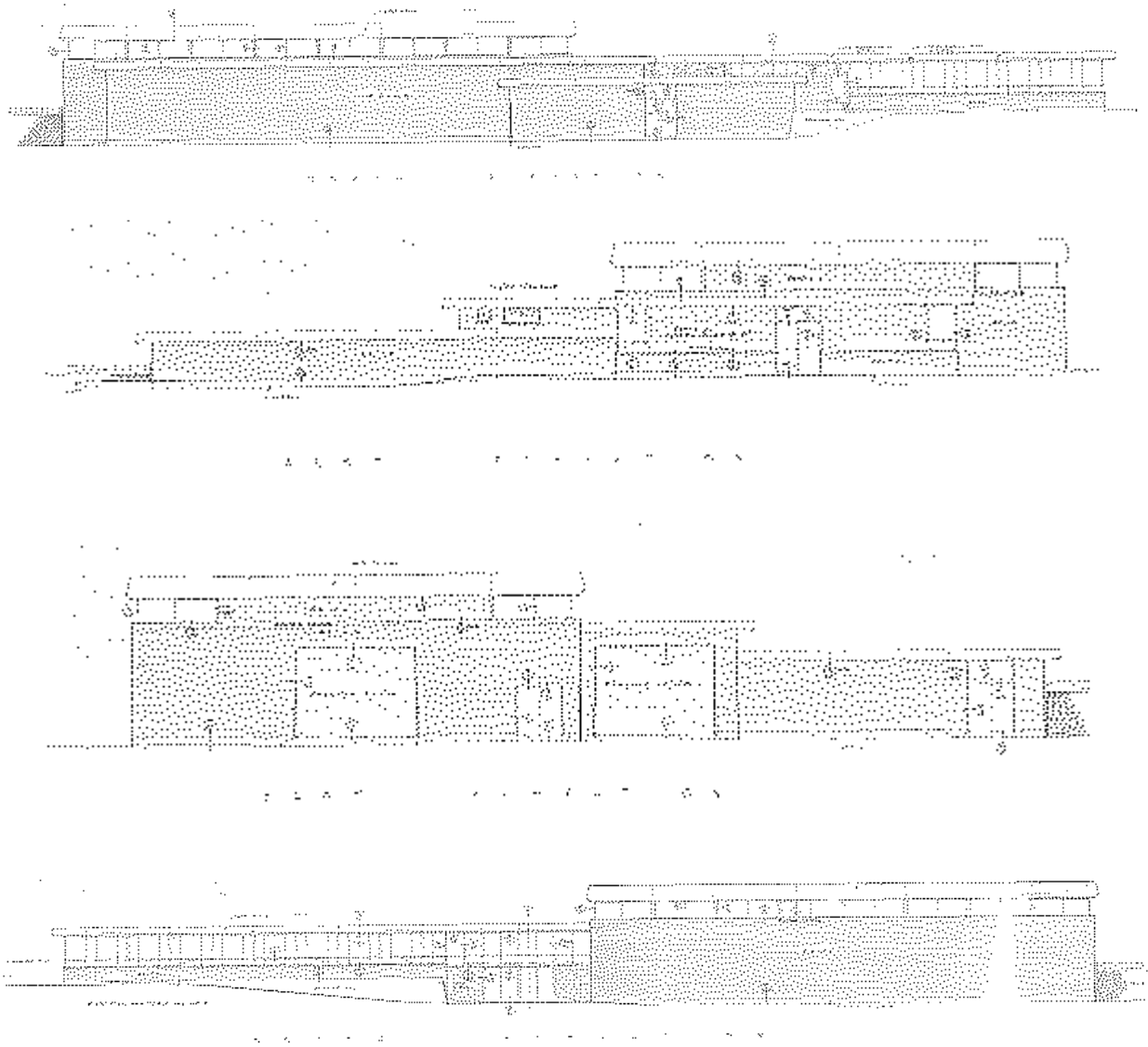
Sketches

APPENDIX C – ORIGINAL CONSTRUCTION DOCUMENTS





ROOF PLAN & PARTIAL FRAMING PLAN



APPENDIX D – EXTENTS OF LATERAL SYSTEM CONSIDERED

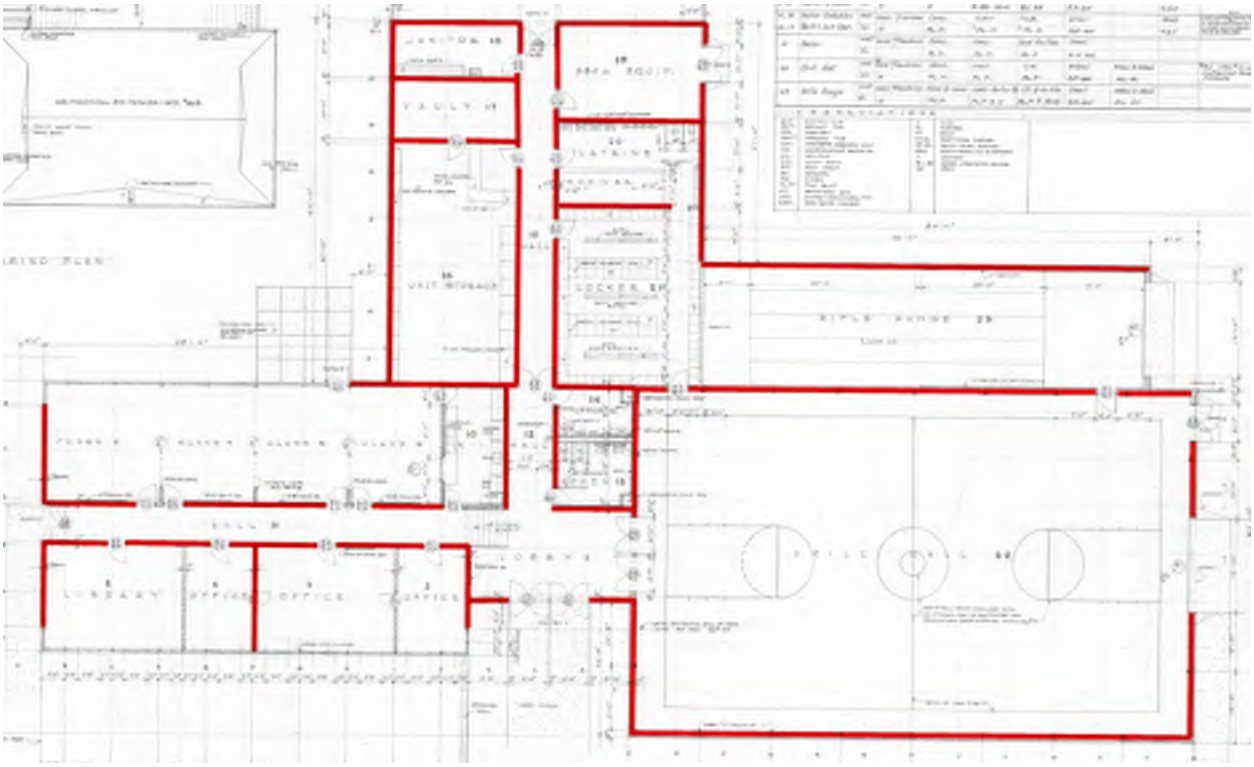


Figure 1 – Shearwall Extents in Plan

ATTACHMENT 6.3

Mechanical & Plumbing Findings & Report

Anacortes Readiness Center Predesign

Basis of Design

notkin
a P2S inc company

www.p2sinc.com

August 11, 2020
Notkin-P2S Project No. 2020-0945

TABLE OF CONTENTS

1.0 PROJECT BACKGROUND

1.1 General

The United States Army National Guard Readiness Center in Anacortes, Washington, is planning a renovation to replace aging mechanical and plumbing systems, as well as to bring the building up to current codes and environmental requirements.

A Readiness Center's primary function is to provide administrative, training, and material storage areas for the assigned military unit(s). Generally, full-time operations are limited to those personnel required to provide continuous support in unit administration, planning, and recruiting. Part-time, the facility hosts higher-occupancy functions, including unit training on weekends and meetings on one or more nights a month.

A Readiness Center must also stand ready to support State functions such as disaster relief, policing actions in civil disturbances, military and public social functions, and shelters during natural disasters or other emergencies.

The Mechanical and Plumbing renovation will upgrade all of the facility's functional areas, including but not limited to offices, classrooms, kitchen, and restrooms. Upgrades will be made to showers, electrical systems, information technology systems, infrastructure, and heating, ventilation, and air-conditioning (HVAC) systems. The facility will also be expanded by an addition of approximately 4,000 square feet, which will give it greater emergency capacity as well as holding classrooms, storage and supply areas, locker rooms, and restrooms with showers for female members.

The Mechanical and Plumbing designs will consider the various occupancy demands the Readiness Center requires such as:

- General occupancy of four fulltime administrative staff.
- Occupancy of up to 150 people during weekend training.
- Greater occupancy demands in emergency/disaster situations.

1.2 Codes and Standards

The following codes and standards apply to this project:

- International Building Code (IBC)—2018
- International Mechanical Code (IMC)—2018
- Uniform Plumbing Code (UPC)—2018
- Washington State Energy Code (IECC)(WAC 51-11C)—2018
- National Fire Protection Association (NFPA 58)—2020
- National Fire Protection Association (NFPA)—2018
- International Fire Code (IFC)—2015
- ADA Standards for Accessible Design (ADA)—2010
- ANSI Z358.1, *American National Standard for Emergency Eyewash and Shower Equipment* (ANSI)—2009
- ANSI/ASHRAE Standard 55, *Thermal Environmental Conditions for Human Occupancy* (ASHRAE)—2013

- ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality* (ASHRAE)—2019
- ANSI/ASHRAE 90.1, *Standard for Energy Conservation in New Building Design* (AHSRAE)—2019
- NFPA 30, *Flammable and Combustible Liquids Code* (NFPA)—2015
- NFPA 101, *Life Safety Code* (NFPA)—2015
- NFPA 13, *Fire Sprinkler Systems*—2013
- DG 415-1, *Readiness Centers Design Guide*—2011
- DG 415-5, *General Facilities Information Design Guide*—2011
- AR 190-11, *Physical Security of Arms, Ammunition, and Explosives*—2006
- UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*—2/2019

2.0 MECHANICAL DESIGN

2.1 General

Mechanical work on this project involves demolishing the following existing mechanical systems, as they are at the end of their useful life:

- The HVAC system serving the gym/drill room and exercise room, including equipment, ductwork, and appurtenances.
- The hydronic heating system, including boilers, pumps, expansion tank, cabinets, radiators, piping, and appurtenances, as well as all individual controls such as thermostats, temperature sensors, etc.
- The kitchen exhaust hood, including its integrated fire suppression system and make-up air unit.
- Individual rooftop exhaust fans and associated ductwork.
- Low wall-mounted cabinet heaters with outside air intakes located in the offices and classrooms.

Separate new heating, cooling, and outside air ventilation systems will be provided to serve the following four building areas:

- West wing—classrooms and offices.
- North wing—storage, shower, and utility.
- East wing—gymnasium/drill room and exercise room.
- Kitchen.

Other rooms and zones such as IT closets will be on separate, smaller systems to allow for local 24/7 cooling without running the larger systems.

2.2 Design Conditions

The following design conditions are based on ASHRAE design conditions.

Outdoor Spaces

- Summer (cooling): 0.4% frequency of occurrence for dry-bulb temperature and mean coincident wet-bulb temperature. 79.5 degrees F DB and 65.2 degrees F MCWB.
- Winter (heating): 99.6% frequency for mean coincident dry-bulb temperature. 19 degrees F.

Indoor Spaces

- Offices and classrooms: 75 degrees F cooling and 68 degrees F heating.
- Equipment and storage rooms: 75 degrees F cooling and 65 degrees F heating.
- Mechanical spaces: 90 degrees F cooling via exhaust and outside air.

2.3 Proposed Systems

The four building zones identified above and the new addition will be served by separate new code-compliant HVAC systems as described in the following sections. The primary source of heating and cooling will be a hydronic all-electric heat recovery heat pump system that will provide chilled water and heating water simultaneously. All exhaust systems will have associated make-up air supply to keep the building positively pressurized.

2.3.1 West Wing—Classrooms and Offices

The classrooms and offices in the west wing will be served by a rooftop dedicated outdoor air system (DOAS) with fan coils and heat pump. A variable air volume (VAV) system will be provided for the DOAS with occupancy sensors connected to the direct digital control (DDC) system that will shut off or turn down the system when rooms are unoccupied.

2.3.2 North Wing—Storage, Shower, and Utility

Room pressurization for the north wing will be designed to meet or exceed code requirements so as to achieve LEED® certification. The vault and storage rooms will be heated by an outdoor heat pump. The shower and toilet room will have a minimum of 70 cubic feet per minute (cfm) for urinal and water closet, and 50 cfm for showerhead, during occupied hours.

2.3.3 East Wing—Gymnasium/Drill Room and Exercise Room

An energy recovery unit will be used for the east wing. Per ASHRAE 62.1, Table 6.1, a ventilation rate of 0.18 cfm per square foot will be used for the Gymnasium/Drill Room, and a ventilation rate of 0.12 cfm per square foot will be used for the Fitness Room.

2.3.4 Kitchen

Per the 2018 IMC, paragraph 507.2, a Type 1 grease exhaust system is required where an appliance produces grease or smoke. The kitchen will be provided with a UL-listed, VAV Type I hood, with make-up air unit, over the stove. The unit will have automatic controls that will activate when the stove is turned on and activate an appropriate make-up air supply. The hood will also have an automatic fire suppression system.

A 4-ton air conditioning unit will be installed over the kitchen to provide cooling for the serving area.

2.3.5 Building Addition—Classrooms and Additional Storage

For the new building addition, room ventilation will be designed to meet or exceed code requirements. The classrooms will be served by a rooftop dedicated outdoor air system (DOAS) with fan coils and heat pump. A variable air volume (VAV) system will be provided for the DOAS with occupancy sensors connected to the direct digital control (DDC) system that will shut off or turn down the system when rooms are unoccupied.

The new addition contains storage areas that may hold flammable materials. To achieve code compliance these areas will have continuous exhaust ventilation at a rate of 1.5 cfm/sq ft exhausted directly to outdoors. Exhaust fans will be rooftop constant volume up-blast style with an explosion-proof motor. A manual ventilation system shutoff switch will be provided on the exterior of the room adjacent to the entrance door. The ventilation system will be connected to standby emergency power.

Heated Unit Storage will have no mechanical cooling. This storage will have a ventilation rate of three air changes per hour of outside air; during the summer, this will increase to a minimum four air changes per hour.

The Vault will have a minimum four air changes per hour of outside air and will be exhausted directly to the outside. A packaged dehumidifier will be provided. The dehumidifier's condensate drain will be located outside of the Vault. Heating will be provided by the DOAS. Supply ducts entering this space will terminate with security grilles and registers.

2.4 Control System

The facility will be provided with a new DDC system to control and monitor the various HVAC systems. This system will conform to UFGS 23 09 23.02.

2.5 Testing and Balancing

Testing and balancing (TAB) of all HVAC systems, the heating hot water system, and the domestic hot water circulating system will be required to be performed by a TAB agency certified by NEBB.

3.0 PLUMBING DESIGN

3.1 General

Plumbing work on this project involves demolishing the existing plumbing piping and fixtures, as they are at the end of their useful life, and providing new plumbing piping and fixtures for domestic water, sanitary waste and vent, and natural gas. All piping systems will have dedicated shutoff valves as well as point-of-connection shutoff valves.

3.2 Domestic Water

The existing 2-inch domestic water supply enters the building in the Janitor's Closet. A reduced pressure backflow assembly (RPBA) will be installed at the point of entry. From there domestic water will be distributed through the building to restrooms, showers, and the kitchen. The distribution system will have its own electric water heater, plus a hot water recirculation system and expansion tank. The water heater will produce 140 degrees F water in the tank to limit Legionella growth. A thermostatic mixing valve will reduce the water temperature to 120 degrees F. Each public restroom will have a mixing valve set at 110 degrees F as required by code.

Domestic hot, cold, and recirculating water distribution piping will be Type "L" copper. Piping will be insulated per code and covered with an all service jacket (ASJ) and vapor barrier. Piping will be labeled with contents and direction of flow. Water velocity in the water distribution system will be limited to no more than six feet per second due to noise and corrosion considerations. For the recirculating system, a new bronze-fitted circulating pump, balancing valves, and associated piping will be installed. Water hammer arresters will be installed in the men's and women's toilet/shower rooms.

Plumbing fixtures will be as follows:

- Flush valve toilets will be 1.28 gallons per flush (GPF) with a manual flush valve.
- Urinals will be 0.5 GPF with a manual flush valve.
- Restroom lavatories will have 0.5 gallons per minute (GPM) faucets with manual wrist blade handles.
- Showers will have 1.5 GPM, manually operated water saving valves and shower heads.
- The water cooler will be an ADA-compliant, hi-low configuration model and have chilled water and a water filtered laminar flow bottle filler system.

The janitor's room will have a floor set service sink and a floor drain with trap primer. Exterior hose bibbs will be freeze-proof and tamper-proof; they will be installed at approximately 50 to 100 linear feet distance around the building.

3.3 Waste and Vent

Sanitary waste piping will be no-hub cast iron with heavy duty couplings below grade and regular couplings above grade, and will connect to the city's sanitary sewer system. New waste piping will be sloped at a minimum of two percent per linear foot. New vent piping will be cast iron or type DWV copper having drainage pattern cast brass fittings and 95-5 solder or no-hub cast iron. Vent piping will penetrate the roof to relieve any fumes from the sanitary sewer system.

Floor drains will be installed in the restrooms, shower areas, and kitchen. Restroom floor drains will be provided with trap primer valves to prevent sewer gases from infiltrating occupied spaces. The trap

primer for the restrooms will be flush valve type, located as an accessory on the ADA water closets flush valve.

3.4 Energy Savings

For increased HVAC efficiency, the option of energy recovery from exhaust air streams will be considered.

For water savings, low flow fixtures and hands-free faucets will be used in the restrooms and shower areas.

4.0 FIRE PROTECTION DESIGN

The sprinkler system will primarily be a light hazard wet sprinkler system. Small areas of the building such as storage areas will require systems of greater hazard classification. Dry sprinklers will be provided for exterior areas of the building such as overhangs and covered loading to provide complete protection.

ATTACHMENT 6.4

Electrical & Signal Findings & Report

1.0 ELECTRICAL INVESTIGATION SCOPE OF REPORT

The purpose of this report is to summarize the existing conditions of the electrical and low voltage systems in the building and to make recommendations on work that should be completed with the proposed addition and remodel project.

1.1 ELECTRICAL SERVICE

CURRENT CONDITION

The electrical service was initially installed in 1962 as a 120/240V 1 phase overhead service to a 600 amp Main Switchboard. This service was upgraded in 2003 with a new main switchboard and the service entrance conductors were changed to underground conduits. load calculations from previous projects indicate that the service has a connected load of approximately 275 amps.

RECOMMENDATION

The 600 amp service does appear to have adequate capacity, and is in a location that does not appear to conflict with the proposed addition, therefore, it is recommended that the existing service conductors and C.T. enclosure be retained and re-used in the proposed new work.

1.2 ELECTRICAL PANELS

CURRENT CONDITION

The Main Switchboard and Panel D were installed in the 2003 remodel and are in good condition.

Three other electrical panels – Panel A, Panel B, and Panel C – were installed in the original 1962 construction and are nearing the end of their useful life.

RECOMMENDATION

It is recommended to replace the old panels with new panelboards in the existing locations.

1.3 GENERATOR POWER SYSTEM

CURRENT CONDITION

There is currently no generator power system on site.

RECOMMENDATION

It is recommended that a standby generator power system be added to the facility to allow the facility to function in an emergency situation. The generator should be diesel powered and sized to provide power to the entire facility.

A re-configuration of the existing service will be required. A new service entrance rated automatic transfer switch (ATS) will need to be installed between the existing CT enclosure and the Main Switchboard.

1.4 LIGHTING AND LIGHTING CONTROL

CURRENT CONDITION

Existing lighting fixtures throughout the facility have been upgraded to LED fixtures within the past several years. A handful of original incandescent and fluorescent fixtures were found in a couple locations.

Exterior lighting consists of building mounted LED soffit lights only. No parking lot lighting exists, except for the secure area tactical vehicle parking area.

Occupancy sensor lighting controls were also upgraded in corridors and office spaces.

RECOMMENDATION

Existing LED fixtures and existing lighting controls can remain in the existing portions of the facility. Areas of the facility that are remodeled will likely need to have new lighting installed due to the change of space usage or re-configuration of the space. New lighting controls will be required to meet energy code requirements.

It is recommended to add parking lot lighting for the existing parking area on the north side of the building.

1.5 FIRE ALARM SYSTEM

CURRENT CONDITION

The existing fire alarm system is the original 1962 vintage Edwards systems, 120V fire alarm system. The system consists of pull stations and alarm bells only and does not include automatic smoke detection or code compliant occupant notification.

RECOMMENDATION

Replace the existing fire alarm system in its entirety with a new coded compliant system. It is recommended to provide common area smoke detection at a minimum and full occupant notification throughout the facility.

1.6 VIDEO DORBELL SYSTEM

CURRENT CONDITION

The existing video doorbell system at the north and south doors is a recent addition and is working adequately.

RECOMMENDATION

Keep the existing system and expand it to the additional entrance doors.

1.7 ACCESS CONTROLS SYSTEM

CURRENT CONDITION

The existing access control system consists of IP based keypads at the north and south entrance doors, but there is no physical door hardware to allow the system to lock and unlock doors.

RECOMMENDATION
Expand the existing system to the new entrance doors and upgrade the existing doors to allow for the system to operate correctly. New door hardware will need to be provided at the existing doors.

1.8 SURVEILLANCE SYSTEM

CURRENT CONDITION
Existing IP based video surveillance cameras are installed on the exterior and interior of the building.

RECOMMENDATION
Retain the existing system and expand it to the new addition.

1.10 TELECOMMUNICATIONS SYSTEM

CURRENT CONDITION
The communications wiring in the facility was replaced in 2009 with CAT6 standard wiring and outlets. All of the cabling is routed to an equipment rack adjacent to the electrical panels in the main electrical room.

The existing cabling is currently routed through an area of the building that will be significantly impacted by the remodel work and will likely need to be re-routed in order to complete the work.

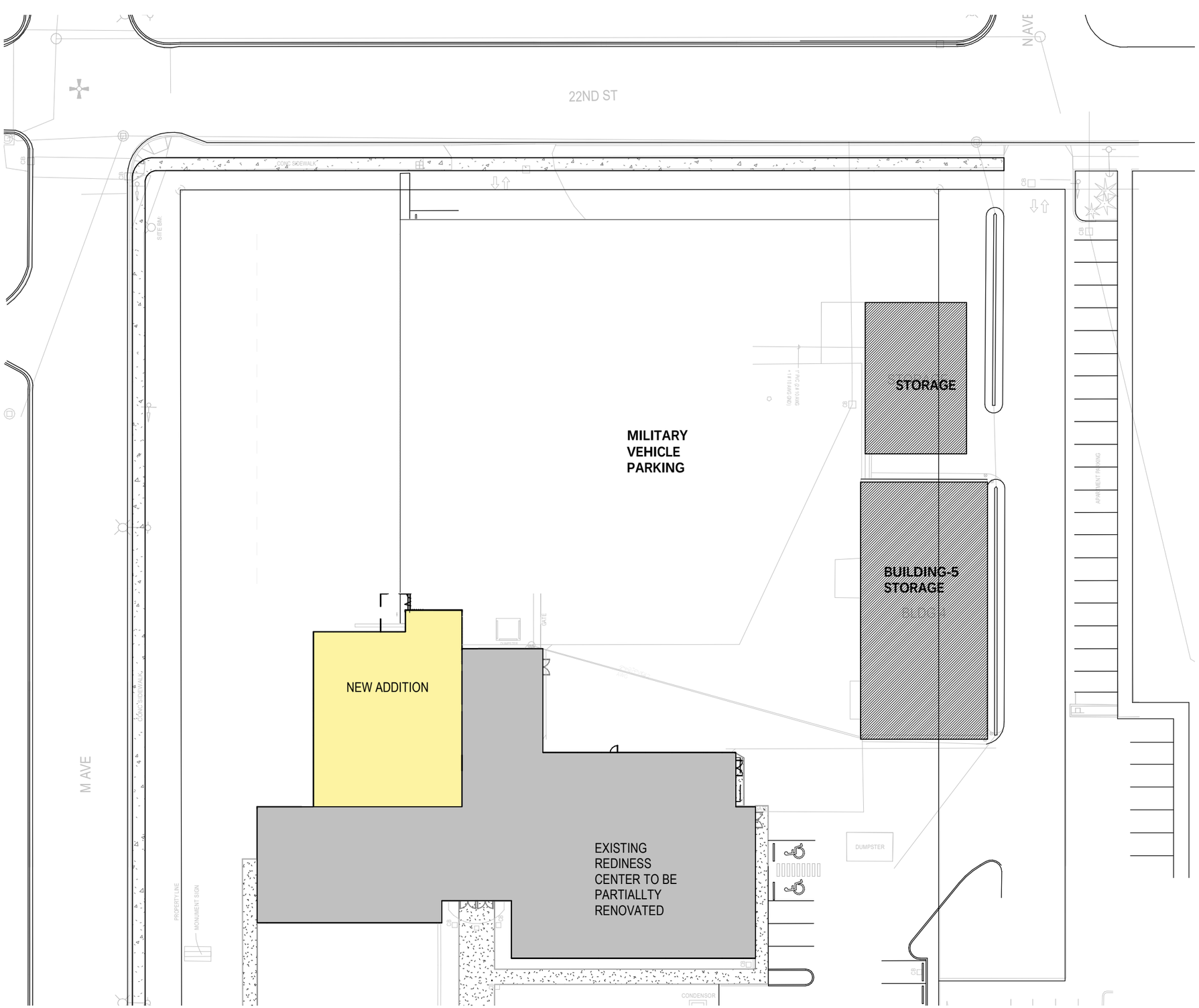
RECOMMENDATION
It is recommended to establish a new communications room in the vicinity of the existing kitchen and re-route the existing communications cabling to this room. New comm cabling can be installed from the addition to this room as well. New backbone cabling will need to be installed from this new comm room to the location of the utility demarc point in the existing main electrical room.

1.13 OTHER BUILDINGS ON SITE

STATUS
Other storage buildings on site will remain and will not be affected by the addition and remodel work.

ATTACHMENT 6.5

Preliminary Diagrams and Sketches

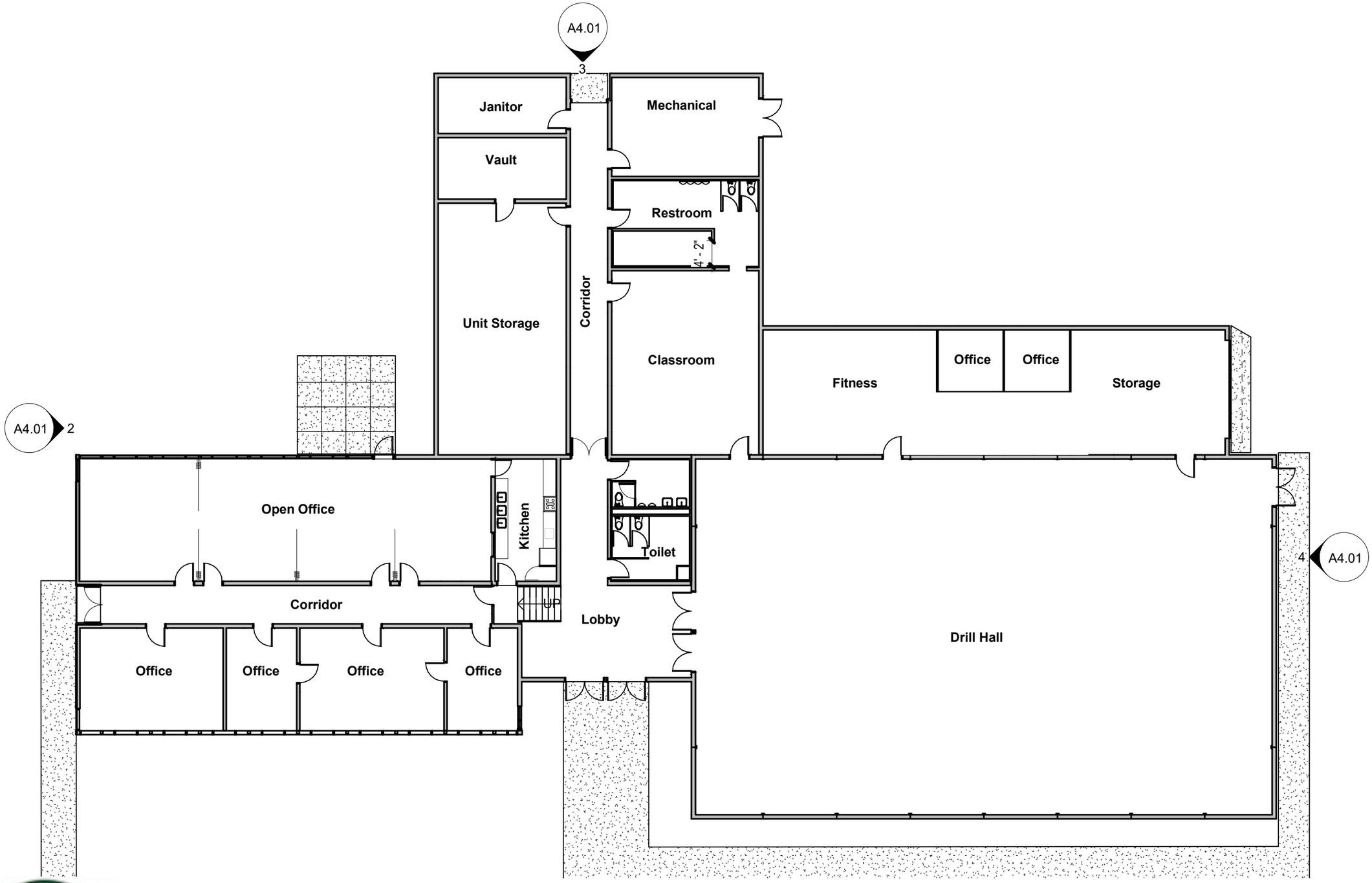


Anacortes Rediness Center

Site Plan

08/11/20

SSW ARCHITECTS
SCHREIBER
STARLING
WHITEHEAD



Graphic Scale: 1 inch = 4 feet

0 4' 8' 12' 16'

Anacortes Rediness Center

Floor Plan (Existing)

08/06/20

ARCHITECTS
SCHREIBER STARLING WHITEHEAD

Anacortes Rediness Center

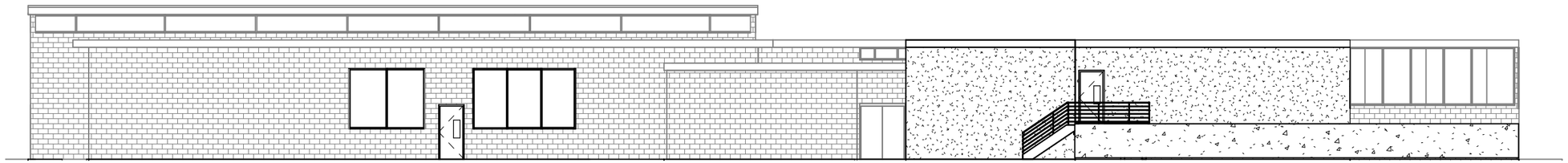
Floor Plan (Proposed)

Graphic Scale: 1 inch = 4 feet

0 4' 8' 12' 16'

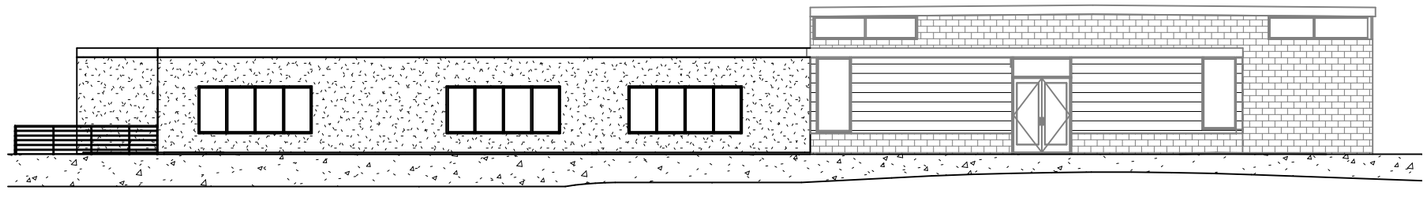
08/06/20

ARCHITECTS
SCHREIBER STARLING WHITEHEAD



1 / A4.03 North- Addition

Scale: 1/16" = 1'-0"



2 / A4.03 West- Addition

Scale: 1/16" = 1'-0"

Anacortes Rediness Center

Elevations

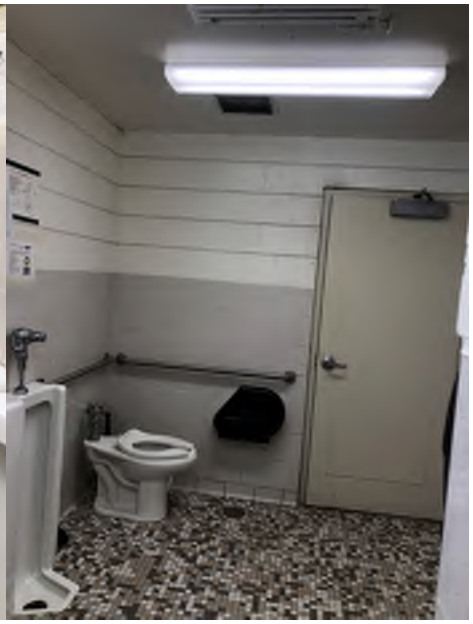
08/27/20

SSW ARCHITECTS
SCHREIBER STARLING WHITEHEAD

ATTACHMENT 6.6

Existing Conditions


WASHINGTON
NATIONAL GUARD
READINESS CENTER

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TEXT GOWAGUARD TO 70000
LIFT CHAIR
OUT OF ORDER
DO NOT USE

ARCHITECTURE
N THE PUBLIC
INTEREST