



2019 CAPITAL FACILITIES PLAN

Rice Fergus Miller Architecture

Adopted by the CKFR Board of Commissioners on November 12, 2019

October 26, 2019

John Oliver, Fire Chief Central Kitsap Fire & Rescue 5300 NW Newberry Hill Rd, #101 Silverdale, Washington 98383

RE: Capital Facilities Plan

Dear Chief Oliver,

It is with great pleasure that we present this Capital Facilities Plan to you, your Commissioners, and members of Central Kitsap Fire & Rescue.

This report is the culmination of a year-long effort to determine the programming and planning requirements of improving your fire stations and supporting facilities. Included in this report are the programmatic requirements, building assessments, conceptual improvement plans, and cost projections for undertaking these contemplated projects.

Please feel free to give us a call if you have any questions about the information or recommendations in this report. We have enjoyed working with all of you and look forward with enthusiasm to the fruition of these projects.

Sincerely,

Rice Fergus Miller, Inc.

David A. Fergus

Principal



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Executive Summary

Introduction and Project Description

The Capital Facilities Plan includes in-depth, district-wide, examinations of all existing stations, and assessments of which stations should be renovated, and which should be replaced. In the case of new and remodeled structures, floor plans have been prepared to indicate what facilities might look like. For all improvement projects, detailed cost estimates have been prepared for likely costs.

The planning process has taken place over the past year, incorporating input from a diverse cross-section of fire district personnel. While it is difficult to predict what the future may hold, District needs were evaluated from a 20-year perspective. To this end, the conclusions reached in this report ensure improvements will serve the needs of the District and its citizens far into the future.

Program Description

Central Kitsap Fire & Rescue's Capital Facilities Plan includes renovating or replacing eight existing fire stations. The newest of these stations was constructed 20 years ago, and the oldest 56 years ago. All have been subject to various remodels and additions; while the District has done a fine job caring and maintaining these facilities, operational deficiencies abound, stations lack certain updated industry amenities, and stations are not compliant with current building codes for new construction. Stations scheduled for replacement have undergone a comprehensive evaluation for renovation verses replacement to determine the most cost-effective approach. In several cases, renovation in an attempt to meet today's building codes and standards while correcting operational deficiencies was deemed difficult and cost prohibitive at best.

The Capital Facilities Plan also calls for the addition one new station in the Lake Symington area. As the greater Silverdale area has continued to grow westward, this area of the District has naturally increased in its number of calls for service. This trend has been ongoing for many years, and in 2006 property was purchased near Camp Union for a future fire station. This Capital Facilities Plan includes construction of that station.

Primary goals and objectives used to define these improvement projects include the following:

- Facility improvements support personnel and equipment in the right locations throughout the District based on current and future demands for emergency services
- Health and safety are improved for the emergency personnel working out of these stations
- Structural measures are taken to preserve the integrity of these fire stations after a significant earthquake, ensure uninterrupted service, and protect the personnel who work out of these facilities
- Improvements support care and storage of the District's equipment





- Improvements bring existing stations into reasonable compliance with current building codes, standards, and modern fire station design practices
- Improvements support operational efficiency of the stations

Conceptual Design

During the planning process, it became apparent that utilizing a standardized prototype fire station plan would be an efficient and cost-effective approach for several of the District's rural fire stations. The operational needs and staffing levels for these rural stations are virtually identical. Adopting a prototype approach would afford cost savings in design and construction and increase standardization across the District. Ultimately, a prototype plan was adopted for the District's four rural stations, and as a basis for expanding Fire Station 42.

The prototype station is envisioned at approximately 8,800 square feet and able to accommodate four firefighters with an apparatus bay for three vehicles. Included in this report are room-by-room diagrams noting the space requirements for this prototype fire station, as well as a preliminary floor plans and artistic renderings of the structure.



Prototype Fire Station - Character Sketch

Program Summary/Requirements

CKFR's Capital Facilities Plan calls for the following elements:

- Seismically reinforcing existing Fire Stations 42, 56, and 64
- Significantly remodeling and seismically reinforcing Fire Station 41
- Constructing a new Fire Station 57 in the Lake Symington area
- Relocating and replacing Fire Station 52 so it provides better response capabilities
- Replacing Fire Stations 45 and 51 on their current properties
- Replacing Fire Station 53 on the adjacent Central Kitsap School District property

Materials, Finishes, and Equipment

The planning process included preliminary selection of materials and finishes, identification of equipment needs, and confirmation of performance expectations for each fire station project. This was done to ensure construction cost estimates would match the level of quality expectations for the District. It also established a benchmark for quality which can later be adjusted, if necessary, to match available funding or other financial limitations established by the District.



Anticipated Costs and Project Timeline

RLB|Robinson prepared a detailed professional cost estimate for each contemplated project. All projects were estimated in today's dollars for labor and materials. Because construction cost escalation can be significant over time, projects were prioritized, sequenced, and construction dates targeted based on the District's operational priorities and each facility's current condition. Undertaking two significant projects per year was determined a reasonable pace to complete these projects without overwhelming operations or response capabilities of the District at any one time.

The estimated costs for undertaking these projects, including their anticipated project expenses, are as follows:

Station	Total Project Budget	Anticipated Start of Construction
Fire Station 52	\$9,389,167.00	April 1, 2021
Fire Station 57	\$8,906,396.00	June 1, 2021
Fire Station 53	\$10,203,167.00	April 1, 2022
Fire Station 51	\$16,911,898.00	June 1, 2022
Fire Station 45	\$9,862,874.00	April 1, 2023
Fire Station 64	\$299,182.00	June 1, 2023
Fire Station 41	\$6,818,481.00	April 1, 2024
Fire Station 56	\$622,156.00	June 1, 2024
Fire Station 42	\$143,923.00	April 1, 2025

Total for All Projects:

\$63,157,245.00 *This figure was updated on November 1, 2019

Total for All Projects: \$57,737,017

(see next page for project cost breakdown)

End of Executive Summary



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November 1, 2019	52	57	53	51	45	64	41		56		42
Target Election Date: August 2020	Anderson Hill	Coho Run	Seabeck	Silverdale	North Perry	Chico	Meadowdale		Seabeck Hwy		Island Lake
	NEW	NEW	REPLACE	REPLACE	REPLACE	SEISMIC UPGRADE	MAJOR REMODEL	SEISMIC UPGRADE	MINOR REMODEL	SITEWORK & STO. BLDG.	SEISMIC UPGRADE
						OI OILABL	KEMODEE	OI OILABE	KLINODEL	010.0200.	OI OIMADE
Project Sequence	1	2	3	4	5	6	7	8	8	8	9
Target Bid Date	4/1/2021	6/1/2021	4/1/2022	6/1/2022	4/1/2023	6/1/2023	4/1/2024	6/1/2024	6/1/2024	6/1/2024	4/1/2025
Robinson Estimates											
Building Improvements	\$ 4,355,419	\$ 4,355,419	\$ 4,355,419	\$ 7,834,805	\$ 4,355,419	\$ 182,457	\$ 4,024,197	\$ 364,791	\$ 337,006 \$ -	\$ 866,235	\$ 81,675
Site Improvements	\$ 1,440,445	\$ 1,070,862	\$ 1,400,000	\$ 1,843,282	\$ 1,080,226	\$ -	\$ -	\$ -	\$ -	\$ 1,036,701	<u> </u>
Raw Construction Budget	\$ 5,795,864	\$ 5,426,281	\$ 5,755,419	\$ 9,678,087	\$ 5,435,645	\$ 182,457	\$ 4,024,197	\$ 364,791	\$ 337,006	\$ 1,902,936	\$ 81,675
Construction Cost Escalation Target Bid Date at 4.0% per year since October 2019	\$ 351,537	\$ 366,969	\$ 593,264	\$ 1,067,815	\$ 800,140	\$ 28,235	\$ 777,550	\$ 73,347	\$ 67,760	\$ 382,615	\$ 19,679
Construction Budget, including Inflation	\$ 6,147,401	\$ 5,793,250	\$ 6,348,683	\$ 10,745,902	\$ 6,235,785	\$ 210,692	\$ 4,801,747	\$ 438,138	\$ 404,766	\$ 2,285,551	\$ 101,354
Soft Costs											
Washington State Sales Tax @ 9.0%	\$ 553,266	\$ 521,393	\$ 571,381	\$ 967,131	\$ 561,221	\$ 18,962	\$ 432,157	\$ 39,432	\$ 36,429	\$ 205,700	\$ 9,122
Architecture and Engineering Fees @ 9%	\$ 553,266	\$ 521,393	\$ 571,381	\$ 967,131	\$ 561,221	\$ 18,962	\$ 432,157	\$ 39,432		\$ 205,700	\$ 9,122
Specialty Consultants @ 4% Permits, Testing, Inspections @ 3%	\$ 245,896 \$ 184,422	\$ 231,730 \$ 173,798	\$ 253,947 \$ 190,460	\$ 429,836 \$ 322,377	\$ 249,431 \$ 187,074	\$ 8,428 \$ 6,321	\$ 192,070 \$ 144,052	\$ 17,526 \$ 13,144	* -, -	\$ 91,422 \$ 68,567	\$ 4,054 \$ 3,041
Furnishings and Equipment @ 2%	\$ 122,948	\$ 115,865	\$ 126,974	\$ 214,918	\$ 124,716	\$ 4,214	\$ 96,035	\$ 8,763		\$ 45,711	\$ 2,027
Temporary Housing / Accomodations @ 4%	\$ -	\$ -	\$ -	\$ 429,836	\$ 249,431	\$ 8,428	\$ 192,070	\$ 17,526		\$ -	\$ 4,054
Moving Expenses @ 1%	\$ 61,474	\$ 57,933	\$ 63,487	\$ 107,459	\$ 62,358	\$ 2,107	\$ 48,017	\$ 4,381	\$ 4,048	\$ 22,856	\$ 1,014
Contingency @ 10%	\$ 614,740	\$ 579,325	\$ 634,868	\$ 1,074,590	\$ 623,578	\$ 21,069	\$ 480,175	\$ 43,814	\$ 40,477	\$ 228,555	\$ 10,135
Total Soft Costs	\$ 2,336,012	\$ 2,201,435	\$ 2,412,499	\$ 4,513,279	\$ 2,619,030	\$ 88,490	\$ 2,016,734	\$ 184,018	\$ \$ 170,002	\$ 868,509	\$ 42,569
Property Acquisition Anticipated Property Acquisition Costs	\$ -	\$ -	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
, , , ,								Phase 1	Phase 2	Phase 3	
TOTAL ANTICIPATED PROJECT BUDGET	\$ 8,483,413	\$ 7,994,685	\$ 9,261,182	\$ 15,259,181	\$ 8,854,814	\$ 299,182	\$ 6,818,481	\$ 622,156	\$ 574,768	\$ 3,154,060	\$ 143,923

Total all Projects: \$ 57,737,017



Overview

District History

In 1942, a group of citizens in the Silverdale area petitioned for the formation of a fire district to protect their area. The voters in the area approved the ballot measure and Kitsap County Fire Protection District #1 was formed on June 22, 1942 – the first fire district in Kitsap County.

Other citizen groups followed suit, including North Perry forming Fire District 9 in 1949, Tracyton forming Fire District 11 in 1952, and Brownsville forming Fire District 15 in 1954.

Tracyton's District 11 merged into Brownsville's District 15 in 1977 and constructed the present Fire Station 41 as their Headquarters with Trident Impact funds.

In 1989, North Perry's Fire District 9 merged into Brownsville's Fire District 15 and in 1999, Fire District 15 merged into Fire District 1. The merging of these two fire districts included a name change to Central Kitsap Fire & Rescue that better reflected their geographic reach and increased response capabilities.

On January 1, 2003, Kitsap County Fire District 12, located in Chico, merged into Central Kitsap Fire & Rescue, further expanding the district's geographic reach and capabilities.

Central Kitsap Fire & Rescue maintains strong alliances with its neighboring fire districts and departments, all of whom have mutual aid agreements to provide resources and help to one another when called upon.

Mission, Vision, and Values

CKFR Mission

We are dedicated to the preservation and protection of life, property, and the environment.

CKFR Vision

We will provide the best possible life safety education, fire suppression, rescue, and emergency medical services to citizens in Kitsap County.

CKFR Values and Core Covenants

We recognize that fulfilling our mission requires that we work effectively with one another. The following values and core covenant statements demonstrate how we will act in relationship to ourselves, the District and our community.

Integrity

We will remember that our first priority is to serve our citizens effectively and efficiently in their time of need. We will adhere to a moral and ethical code to establish trust, respect, and cooperation.





Loyalty We owe our allegiance to the citizens. We will fulfill our obligation by being

faithful to one another and to our mission.

Duty We have chosen to submit to the moral obligation of serving our

community. We will fulfill this duty to the best of our ability each and every

day.

Respect We understand that our community is diverse. In order to promote goodwill

and civility, we will treat others as we ourselves desire to be treated.

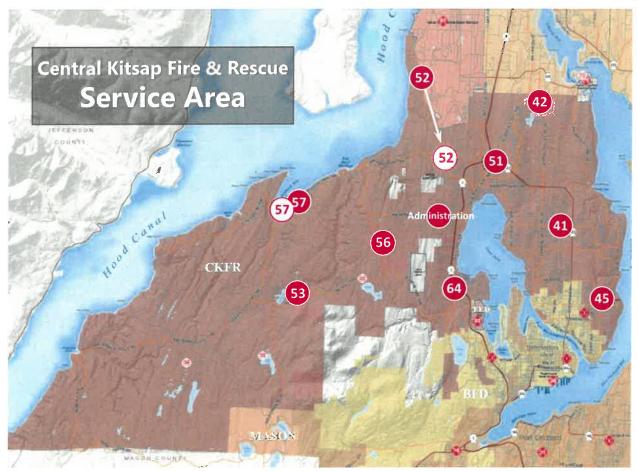
District Facilities

Currently, Central Kitsap Fire & Rescue protects approximately 72,000 residents over an area of 115 square miles. The fire district is bordered by Hood Canal to the west, Puget Sound to the east, Bremerton Fire Department and North Mason Regional Fire Authority to the south, and Poulsbo Fire Department and Bangor's Puget Sound Federal Fire Department to the north.

This Capital Facility Plan calls for seismic reinforcement of fire stations 64, 56, and 42, replacing fire stations 51 and 45 on their current properties, the interior renovation of fire station 41, replacing fire stations 52 and 53 on new properties, and the addition of new fire station 57 close to Lake Symington.

No improvements are planned at this time to the District's Administrative Headquarters, Vehicle Maintenance Facility, Central Supplies, or training facilities.





Map: Central Kitsap Fire & Rescue Service Area

End of Overview

Fire Station 41 - Meadowdale

Built in 1979, Fire Station 41 is 13,587 square feet in size. The station includes living quarters for 6 firefighters, a multipurpose meeting room available to the community, and several offices. Outside the station is a vehicle fueling facility, a large parking area, and a three-story training tower.

Prior to the merger of Fire Districts 1 and 15 into today's Central Kitsap Fire & Rescue, this station was the Headquarters for Kitsap County Fire



Fire Station 41 - Meadowdale 7600 Old Military Road NE, Bremerton, WA 98311

District 15. As such, its internal layout and organization was designed for an administrative function that no longer exists. Rooms and spaces that were once occupied as offices are now awkwardly used and spatially inefficient. Adding to these inefficiencies is an overall lack of accommodation for the demographic changes of firefighters over the past 40 years, adequate space for cleaning and decontaminating equipment, and proper storing of bunker gear.

On the north side of the station's parking lot is a three-story training tower. The structure is in poor condition and at risk of collapse in the event of a design-level earthquake.

Observed Deficiencies

- No decontamination facilities
- Poor storage for bunker gear
- Does not meet current ADA accessibility requirements restrooms, kitchens, doorways, lobby entrance, and access to lower floor
- Lack of fire sprinklers throughout entire station only sleep areas are currently sprinklered
- The station is at risk of being unsafe to occupy after a design-level earthquake
- The training tower is at risk of collapse after a design-level earthquake
- Inadequate storage for equipment and supplies throughout station
- Materials and finishes are worn out, especially in restrooms and kitchen some have been in place for 40 years
- Disproportionate number of restrooms and showers in relation to increased number of female firefighters on staff
- Group restroom/showers in lieu of today's standard private facilities
- High energy costs resulting from inefficient light fixtures
- High energy costs due to lack of insulation and poor windows that are not in compliance with current energy codes
- General spatial inefficiency space having previously been a Headquarters Fire Station





Low level of building security – exterior doors, visibility of entrances, parking areas

Proposed Improvements

Phase 1: Immediate Needs

In addition to operational deficiencies noted above, Station 41 has significant seismic deficiencies. In the event of a major earthquake, the operational readiness of the station could be substantially compromised and threaten the health and safety of the building occupants. It is recommended that, at a minimum, Station 41 undergo a seismic retrofit to bring it into compliance with current codes and standards.

Additionally, the 3-story Training Tower on the north side of the parking lot would be removed to ground level.

We have estimated the construction costs to undertake these Phase 1 improvements to be approximately \$230,000.



Phase 2: Deferred Improvements

Despite the observed deficiencies noted above, Station 41 is delivering excellent emergency services to citizens.

The long-range vision for Fire Station 41 would be an internal remodel and reorganization of spaces to be more operationally efficient, meet current life safety codes, and replace finishes throughout the station that are failing, worn out, or maintenance intensive. These objectives would all be accomplished within the current exterior walls of the station. No building additions are envisioned. A plan for this long-range vision has been included in this Capital Facilities Plan for informational purposes.

At the front lobby and former administrative office areas of the station, walls would be reconfigured to provide proper storage space for firefighter's bunker gear and a shared work area for on-duty firefighters. This area would have views to the parking areas, building approach, and lobby, and direct access to the apparatus bay for swift departure from the station when called.

The cramped, worn out, windowless kitchen would be reconfigured with the crew's dining and dayroom area. The improvements would provide better visibility and more direct access to the apparatus bay.

The reconfigured dorm area on the south side of the apparatus bay will provide private restrooms and showers, mitigating the issue of privacy for men and women on shift.





The existing hose tower at the rear of the apparatus bay will be removed down to the roof line as recommended by the seismic assessment report prepared by Reid Middleton.

All areas being substantially remodeled and/or reconfigured will receive new finishes.

Mechanical, electrical, and plumbing upgrades would be made throughout the station, along with the addition of fire sprinklers.

The estimated construction cost for undertaking Phase 1 and 2 together would be approximately \$4,024,197.00 in 2019 dollars. This amount does not include project expenses, nor inflation, which will be dependent on the construction start date.

End of Fire Station 41 - Meadowdale



KEY NOTES - FLOOR PLAN GENERAL NOTES - FLOOR PLAN

AGGHERTURE PETRUDOS ALARMO VIELAS 275 FFFT STREET, SUITE 400 BREMERTON, WA 98937 360-377-9773 RFMARCH.CON

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE STATION 41
PROJECT ADDRESS CITY NAME, STATE



FLOOR PLAN - LEVEL 1

A21.11







Program Needs Checklist

Fire Station Remodel

Currently Adequate? (Yes/No)

Needed Improvements

Operations

Apparatus Bay Decon Shop

App Bay Restroom Bunker Gear Storage General Storage

Clean Project Room App Bay Janitorial

Living Quarters

Sleep Rooms Restroom/Showers Kitchen Dining

Dayroom Fitness Laundry

Janitorial

Public and Front of the House Public Lobby

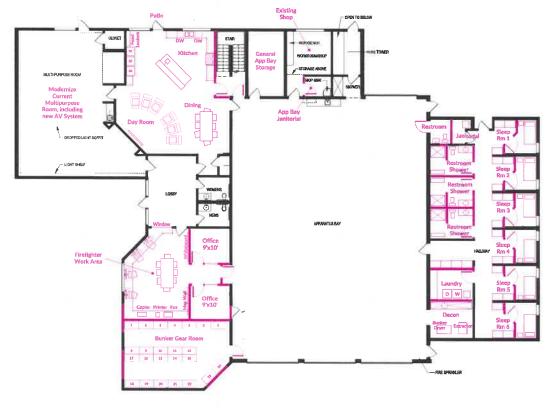
Public Restroom(s) Community / Training Room Firefighter Work Area(s) Private Office(s)



GROSS SF: 3099 SF



2 BASEMENT - FLOOR PLAN



GROSS SF: 10483 SF = 1 LEVEL 1 - FLOOR PLAN RICEFERGUSMILLER

ARCHITECTURE INTRIBUTES PLANNING
275 FIFTH STREET, SUITE 100
BREMERTON, WA 98337
360-377-6773
RFMARCH.COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE
STATION 41
PROJECT ADDRESS
CITY NAME, STATE

PROJECT# PROJECT STATUS ISSUE DATE JANUARY 1, 2018 FLOOR PLAN - LEVEL 1

TOTAL GROSS SF: 13582 SF



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Medowdale Station 41 Summary

Station 41 Gross Area: 13,587 SF Rates Current At September 2019

Desc	ription		Cost/SF	Total Cost
A10	Foundations		\$2.12	\$28,800
B10	Superstructure		\$0.17	\$2,280
B20	Exterior Enclosure		\$10.45	\$142,014
B30	Roofing		\$0.25	\$3,344
C10	Interior Construction		\$10.38	\$141,048
C30	Interior Finishes		\$15.11	\$205,246
D20	Plumbing		\$32.00	\$434,784
D30	HVAC		\$52.00	\$706,524
D40	Fire Protection		\$6.80	\$92,392
D50	Electrical		\$60.00	\$815,220
E10	Equipment		\$5.09	\$69,120
E20	Furnishings		\$6.26	\$85,052
F20	Selective Building Demolition		\$8.39	\$114,032
G10	Site Preparations		\$0.92	\$12,500
G30	Site Civil/Mechanical Utilities		\$4.78	\$65,000
Z10	General Conditions		\$31.28	\$425,000
		ESTIMATED NET COST	\$246.00	\$3,342,356
MAR	GINS & ADJUSTMENTS			
Desig	ın Contingency-Remodel	12.0 %		\$401,083
Contr	actors Overhead & Profit	7.5 %		\$280,758
		ESTIMATED TOTAL COST	\$296.18	\$4,024,197



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Medowdale Station 41 Detail

Station 41 Gross Area: 13,587 S. Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cos
A1030	Slab on Grade				
328	Cut and patch slab-allowance	SF	1,440	20.00	28,80
	Slab on Grade			\$2.12/SF	\$28,80
B1020	Roof Construction				
320	Roof Joists, and Plywood Decking	SF	152	15.00	2,28
	Roof Construction			\$0.17/SF	\$2,28
B2010	Exterior Walls				
321	Infill Exterior Walls, Match Existing Brick (Batt, WRB, GWB)	SF	96	64.00	6,14
324	Seismic Upgrade allowance	SF	13,587	10.00	135,87
	Exterior Walls			\$10.45/SF	\$142,01
B3010	Roof Coverings				
322	Asphalt Shingles system to Match Existing Roof	SF	152	22.00	3,34
	Roof Coverings			\$0.25/SF	\$3,34
C1010	Partitions				
288	Interior partitions	SF	3,597	13.55	48,73
289	Add for interior partition types,ratings	SF	3,597	3.50	12,59
	Partitions 2			\$4.51/SF	\$61,32
C1020	Interior Doors				
291	Int. HM door/frame/hdwre-per leaf	EA	18	2,000.00	36,00
292	Misc. door hardware/ratings/readers	LS	1	5,500.00	5,50
308	Interior Relites / Glazing	SF	74	85.00	6,29
	Interior Doors			\$3.52/SF	\$47,79
C1030	Specialties				
293	Specialties allowance	SF	13,587	2.35	31,92
	Specialties -			\$2.35/SF	\$31,92
C3010	Wall Finishes				
294	Interior Painting/sealing	SF	13,587	3.55	48,23
295	Wall protection at apparatus bay walls 8'	SF	1,260	12.00	15,12
296	Ceramic tile wall restrooms/showers	SF	1,084	22.00	23,84
297	Epoxy wall coating at decon and wash alcove-allow 8'	SF	314	16.00	5,02
	Wall Finishes			\$6.79/SF	\$92,22
C3020	Floor Finishes				
		LS		2,500.00	2,50



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Medowdale Station 41 Detail

Station 41 Gross Area: 13,587 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cos
300	Polished concrete flooring	SF	4,114	7.50	30,85
301	Epoxy flooring-decon and wash alcove room-allow	SF	114	16.00	1,82
302	Rubber base allowance	SF	4,114	0.40	1,64
303	Ceramic tile floor	SF	155	22.00	3,41
329	Misc. flooring protect/replace at minor reno	SF	9,359	4.50	42,11
	Floor Finishes			\$6.06/SF	\$82,35
C3030	Ceiling Finishes				
304	ACT ceilings @ sleep rooms / Offices / Work Area	SF	1,021	6.50	6,63
305	GWB ceilings-at restrooms/showers	SF	334	12.00	4,00
306	Acoustical cloud @ dayroom	SF	530	30.00	15,90
307	Ceilings-open to structure/seal-paint	SF	2,229	1.85	4,12
	Ceiling Finishes			\$2.26/SF	\$30,66
D2010	Plumbing Fixtures				
77	Plumbing allowance	SF	13,587	32.00	434,78
	Plumbing Fixtures			\$32.00/SF	\$434,78
D3090	Other HVAC Systems and Equipment				
78	HVAC allowance	SF	13,587	52.00	706,52
	Other HVAC Systems and Equipment			\$52.00/SF	\$706,52
D4040	Sprinklers				
79	Fire protection-allowance	SF	13,587	.6.80	92,39
	Sprinklers			\$6.80/SF	\$92,39
05090	Other Electrical Services				
30	Building electrical-allowance	SF	13,587	60.00	815,22
	Other Electrical Services			\$60.00/SF	\$815,22
E1090	Other Equipment				
309	Extractor/dryer	LS	1	28,500.00	28,50
310	Dishwasher	EA	2	1,500.00	3,00
311	Refrigerator/Freezer	EA	3	3,600.00	10,80
312	Range/oven/hood	LS	1	9,800.00	9,80
313	Bunker gear lockers	EA	24	545.00	13,08
315	Washer and Dryer	EA	1	2,500.00	2,50
316	Misc. equipment/FOIC	SF	4,114	0.35	1,44
	Other Equipment			\$5.09/SF	\$69,12



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Medowdale Station 41 Detail

Station 41 Gross Area: 13,587 & Rates Current At September 2019

Descri	otion	TENES.	Unit	Qty	Rate	Total Cost
E2010	Fixed Furnishings					
317	Shift lockers		EA	22	1,200.00	26,400
319	Casework allowance		SF	4,114	8.50	34,969
325	Misc Casework allowance at minor remodel area		SF	9,473	2.50	23,683
	Fixed Furn	nishings			\$6.26/SF	\$85,052
F2010	Building Elements Demolition					
284	Selective Interior Demolition of Heavy Modernization ares		SF	4,114	10.00	41,140
285	Selective Interior Demolition of Light Moderization areas		SF	9,473	4.00	37,892
286	Hose Tower Demolition to Roof Level		LS	1	25,000.00	25,000
287	Temporary Construction and Protection		LS	1	10,000.00	10,000
	Building Elements De	molition			\$8.39/SF	\$114,032
G1010	Site Clearing					
323	Demo Training Tower & Haul Off		LS	1	12,500.00	12,500
	Site	Clearing			\$0.92/SF	\$12,500
G3010	Water Supply					
326	Fire water supply/vault-allow		LS	1	65,000.00	65,000
	Wate	r Supply			\$4.78/SF	\$65,000
Z1010	General Conditions					
327	General conditions		Mth	10	42,500.00	425,000
	General Co	nditions			\$31.28/SF	\$425,000
	ESTIMATED NE	T COST			\$246.00/SF	\$3,342,356

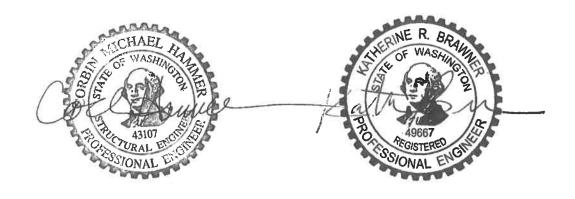
CENTRAL KITSAP FIRE AND RESCUE FIRE STATION 41 AND TRAINING TOWER ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

March 2019

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Appendices

Appendix A: ASCE 41-17 Screening Checklists – Fire Station 41 Appendix B: ASCE 41-17 Screening Checklists – Training Tower

Appendix C: Fire Station 41 Upgrade Concepts

Executive Summary

Reid Middleton, Inc., performed Tier 1 seismic assessments, in compliance with ASCE 41-17, on Central Kitsap Fire and Rescue's Fire Station 41 and Training Tower (located at the same site). These seismic assessments identify potential seismic deficiencies based on the Immediate Occupancy (IO) performance level for the station and the IO and Collapse Prevention (CP) performance levels for the tower. Where deficiencies were noted, recommendations for more detailed seismic evaluations or upgrade concepts are provided.

The evaluations determined each building's expected structural performance for the designated performance objectives. After a seismic event, buildings that meet an IO performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. After a seismic event, buildings that meet a CP performance objective are expected to have little strength remaining and are likely not repairable or safe to reoccupy.

This report includes a description of each building, the identified deficiencies, seismic upgrade concept designs where applicable, and recommendations. Additional factors, such as operational use, functionality, and response times, should also be considered in the decision-making process for these buildings. The Training Tower was found to have seismic deficiencies and does not meet the IO or CP performance objectives. Fire Station 41 was found to have seismic deficiencies and does not meet the IO performance objective.

Existing Fire Station and Training Tower Seismic Evaluation Criteria

The seismic evaluations for the Central Kitsap Fire and Rescue buildings are based on the performance-based earthquake engineering (PBEE) guidelines presented in ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings (American Society of Civil Engineers, 2017). This section provides a general background of PBEE and an overview of seismic retrofit objectives, seismic hazard levels, seismic performance levels, and seismic evaluation and retrofit procedures.

The seismic evaluations do not consider compliance with the seismic requirements of the current building code for new construction. Buildings designed prior to the current building code often include structural configurations and connection detailing that have historically contributed to poor seismic performance in structures, based on post-earthquake evaluations of damaged buildings. Additionally, recent research and studies of regional seismicity have shown that the expected seismic ground motions are higher than was expected in the past. Higher ground motions, structural configurations, and poor connection detailing may result in seismic evaluation deficiencies among buildings constructed to previous building code requirements. Buildings designed to older building code standards are evaluated using evaluation and design guidelines specifically developed for existing structures by the Federal Emergency Management Agency (FEMA) and the American Society of Civil Engineers (ASCE).

The structural findings and recommendations presented in this report are based on visual observations of the buildings and a review of the record drawings. The available record documents do not contain all of the information necessary to confirm the structural configuration of some portions of the buildings, which is typical for older structures.

Reid Middleton participated in a walk-through of Station 41 and the adjacent training tower on February 15, 2019. Visual observations of existing conditions were performed, which did not include destructive or nondestructive testing to confirm or supplement information shown in the record drawings.

The seismic evaluation of the buildings is based on the PBEE guidelines presented in ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings. The ASCE 41 Tier 1 evaluations were completed using the Immediate Occupancy (IO) performance objective. Buildings that meet the IO performance objective will have similar seismic performance to new buildings that are designed as essential facilities. In addition to the IO evaluations, an ASCE 41 Tier 1 evaluation was completed for the Training Tower using the Collapse Prevention (CP) performance objective. Buildings that meet the CP performance objective will be severely damaged and unsafe to reenter after a seismic event. This section includes a general background of PBEE and an overview of seismic rehabilitation objectives, building performance levels, and seismic evaluation and rehabilitation procedures.

Background

ASCE 41-17 employs a Performance-Based Design methodology that allows building owners, design professionals, and the local building authorities to establish seismic hazard levels and

performance goals for individual buildings. PBEE can be defined as the engineering of a structure to resist earthquake demands while also meeting the needs and objectives of building owners and other stakeholders. PBEE allows for the design and analysis of structures for different levels of seismic performance and allows the levels of seismic performance to be related to the relative seismic hazard.

Seismic analysis and design of structures traditionally focused on one performance level — reducing the risk for loss of life in a design earthquake. The concept of designing essential facilities, which are needed immediately after an earthquake, to a higher performance standard evolved after hospitals and other critical facilities were damaged in the 1971 San Fernando, California, earthquake. That concept is balanced by the recognition that the cost of retrofitting existing buildings to higher levels of seismic performance may be onerous to both stakeholders and policy makers.

A comprehensive program was started in 1991, in cooperation with FEMA, to develop guidelines tailored to address this variation of performance levels. The first formal applications of performance-based evaluation and design guidelines were the FEMA 310 Handbook for the Seismic Evaluation of Buildings – A Prestandard (1998) and FEMA 273 NEHRP Guidelines for the Seismic Rehabilitation of Buildings (1997). Following the release of these documents in the 1990s, three additional documents were released in the following years. Another prestandard document, FEMA 356 Prestandard and Commentary for the Seismic Rehabilitation of Buildings, was released in the year 2000. Then, the first national standard seismic evaluation document, ASCE 31-03 Seismic Evaluation of Existing Buildings, was released in the year 2003. Following the release of ASCE 31-03, the first national standard seismic rehabilitation document, ASCE 41-06 Seismic Rehabilitation of Existing Buildings, was released in the year 2007. ASCE 31-03 and ASCE 41-06 superseded the PBEE documents produced in the previous decade. ASCE 31-03 and ASCE 41-06 used the general framework outlined by previous documents but were updated to incorporate the latest standard of PBEE for the time.

ASCE 31-03 and ASCE 41-06 still had flaws; shortly after the release of ASCE 41-06, an effort was undertaken to combine ASCE 31-03 and ASCE 41-06 into a single national standard document, aiming to streamline the documents and eliminate discrepancies. A new PBEE document, ASCE 41-13 Seismic Evaluation and Retrofit of Existing Buildings, combined information from all of the previous documents, reflecting advancements in technology and analysis techniques, and incorporating case studies and lessons learned from recent earthquakes. The newest PBEE document, ACE 41-17 Seismic Evaluation and Retrofit of Existing Buildings, offers more information and instruction on the seismic evaluation process. Significant revisions from the previous edition include nonlinear analysis provisions, nonstructural performance levels, modeling parameters, and more.

ASCE 41-17 provides criteria by which existing structures can be seismically evaluated and retrofitted to attain a wide range of performance levels when subjected to earthquakes of varying severity.

Seismic Hazard Levels

Earthquake ground motions are variable and complicated, and every earthquake is different. An earthquake's intensity and energy magnitude depend on fault type, fault movement, depth to epicenter, and soil strata. In earthquake-prone areas, very small and frequent earthquakes occur every few days or weeks without being noticed by humans, but large earthquakes that occur much less frequently can have a devastating effect on infrastructure and can result in the temporary displacement of large numbers of people. The precise location, intensity, and start time of an earthquake cannot be predicted. However, earthquake hazards for certain geographic areas are well understood based on historical patterns of earthquakes from the geologic record, measured earthquake ground motions, an understanding of plate tectonics, and seismological studies.

Geologists, seismologists, and geotechnical engineers have categorized the seismic hazard for particular locations using probabilistic seismic hazard levels. Each seismic hazard level describes a different probabilistic earthquake magnitude based on the probability of a certain magnitude earthquake occurring in a given time period. Table 1 displays commonly used seismic hazard levels, their corresponding probabilities of exceedance, and mean return periods.

Seismic Hazard Level	Probability of Exceedance in 50 Years	Mean Return Period (Years
50%/50-year	50%	72
20%/50-year (BSE-1E)	20%	225
10%/50-year	10%	475
5%/50-year (BSE-2E)	5%	975
2%/50-year (BSE-2N)	2%	2.475

Table 1. Probabilistic Seismic Hazard Levels and Mean Return Period.

Seismic events with longer mean return periods and smaller probabilities of exceedance are associated with stronger seismic motions, larger ground accelerations, and more potential to damage facilities. Consequently, structures designed or retrofit to a seismic hazard level with a longer return period will generally experience better performance in an earthquake than a structure designed or retrofit to a lower seismic hazard level.

ASCE 41-17 codifies four different Seismic Hazard Levels at which to evaluate or retrofit structures. For voluntary seismic evaluations and voluntary seismic upgrades, the owner of a structure and the structural engineer can decide the Seismic Hazard Level at which it is appropriate to evaluate or retrofit a structure. The codified Seismic Hazard Levels are grouped into two categories: two Seismic Hazard Levels (BSE-1E and BSE-2E) associated with the Basic Performance Objectives for Existing Buildings (BPOE), and two Seismic Hazard Levels (BSE-1N and BSE-2N) associated with the Basic Performance Objectives Equivalent to New Building Standards (BPON).

The ASCE 41-17 defined Seismic Hazard Levels are shown in Table 1, along with their respective probabilities of exceedance in 50 years and mean return period; however, the BSE-1N

Seismic Hazard Level is not shown in Table 1 because ASCE 41-17 defines the BSE-1N Seismic Hazard Level as being two-thirds of the BSE-2N Seismic Hazard Level. The BSE-1N Seismic Hazard Level cannot be directly related to a probability of exceedance or mean return period. Historically (and in previous standards), the BSE-1N Seismic Hazard Level was taken as the 10%/50-year earthquake.

Historically, existing buildings have been seismically evaluated and retrofitted to a lower Seismic Hazard Level than would be typical in new building design. This approach has been historically justified for three primary reasons:

- 1. It ensures recently-constructed structures are not immediately rendered seismically deficient due to minor building code changes.
- 2. Existing buildings often have a shorter remaining life than a new building would; therefore, lower structural resiliency is tempered by a decreased probability of a major seismic event.
- 3. Often the burdensome cost of retrofitting historic structures to a "new building equivalence" performance level is disproportionate to the incremental benefit.

Building Performance Levels and Seismic Retrofit Objectives

A target building performance level must be selected for the design or retrofit of a structure. The target building performance levels are discrete damage states selected from among the infinite spectrum of possible damage states that a building could experience during an earthquake. The terminology used for target building performance levels is intended to represent goals for design, but not necessarily predict building performance during an earthquake.

Since actual ground motions during an earthquake are seldom comparable to that used for design, the target building performance level may only determine relative performance during most events but not predict the actual level of damage following an event. Even given a ground motion similar to that used in design, variations from stated performance objectives should be expected. Variations in actual performance could be associated with differences in the level of workmanship, variations in actual material strengths, deterioration of materials, unknown geometry and sizes of existing members, differences in assumed and actual live loads in the building at the time of the earthquake, influence of nonstructural components, and variations in response of soils beneath the building.

ASCE 41-17 describes performance levels for structural components and nonstructural components of a structure. Historically, much attention was given to the seismic performance of structural components. However, in recent years, it has been realized that attention to the seismic performance of nonstructural components can be equally or more important than the seismic performance of structural components. The ASCE 41-17 identified Structural Performance Levels can be seen in Table 2, and the ASCE 41-17 identified Nonstructural Performance Levels can be seen in Table 3.

Table 2. Identified Structural Performance Levels.

Performance Level Abbreviation	Performance Level Name		
S-1	Immediate Occupancy		
S-2	Damage Control		
S-3	Life Safety		
S-4	Limited Safety		
S-5	S-5 Collapse Prevention		
S-6	Structural Performance Not Considered		

Table 3. Identified Nonstructural Performance Levels.

Performance Level Abbreviation	Performance Level Name		
N-A	Operational		
N-B	Position Retention		
N-C	Life Safety		
N-D	Nonstructural Performance Not Considered		

Individual Structural Performance Levels and Nonstructural Performance Levels can be aggregated to form a combined Building Performance Level. Structural performance during an earthquake is related to the amount of lateral deformation or drift of the structure and the capacity or ability of the structure to deform. Any Structural Performance Level can be combined with any Nonstructural Performance Level, although it is not recommended to combine high levels of structural performance with low levels of nonstructural performance and vice versa.

Theoretically, there are 23 different Building Performance Levels that are combinations of different Structural Performance Levels and Nonstructural Performance Levels. However, ASCE 41-17 recommends that only 15 Building Performance Levels be used in practice due to their recommendation of avoiding mismatching high and low levels of nonstructural and structural performance. ASCE 41-17 defines four specific common Building Performance Levels, as shown in Table 4. A visual representation of these common Building Performance Levels plotted against lateral deformation can be seen in Figure 1.

Table 4. Specific Common Building Performance Levels.

Performance Level Abbreviation	Performance Level Name	Structural & Nonstructural Performance Level Combination
1-A	Operational	S-1 & N-A
1-B	Immediate Occupancy	S-1 & N-B
3-C	Life Safety	S-3 & N-C
5-D	Collapse Prevention	S-5 & N-D

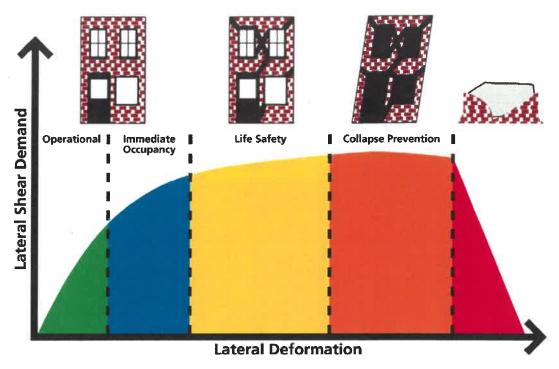


Figure 1. Building Performance Levels.

A decision must be made for each structure as to the acceptable behavior for different levels of seismic hazard, balanced with the construction cost of retrofitting a structure to obtain that behavior. ASCE 41-17 defines "baseline" basic performance objectives for structures based on their defined Risk Category. The Risk Category is the same that is defined in the International Building Code and ASCE 7. For example, for a Risk Category II structure retrofitted to the BPON standards, the structure would need to be retrofitted for the 3-B Building Performance Level at the BSE-1N Seismic Hazard Level and the 5-D Building Performance Level at the BSE-2N (2%/50-year) Seismic Hazard Level. ASCE 41-17 allows for higher (enhanced) or lower (limited) objectives to be selected based on the essential nature of the facility, the expected remaining life of the building, and the associated cost and feasibility. For example, it may not be economically feasible to retrofit historic structures to the BPON standards, and ASCE 41 allows for selection of a limited objective for such situations.

Table 5 summarizes the approximate levels of structural and nonstructural damage that may be expected at the damage states that define the structural performance levels.

Table 5. Approximate Expected Damage for Different Building Performance Levels1.

	Building Performance Levels				
	Collapse Prevention	Life Safety	Immediate Occupancy	Operational	
Overall Damage	Severe	Moderate	Light	Very Light	
Permanent Drift	Large. 1% to 5%.	Some. 0.3% to 1%.	Negligible.	Same as Immediate Occupancy.	
Remaining Strength and Stiffness After Earthquake	Little. Gravity system (columns and walls) functions, but building is near collapse.	Some. Gravity system functions, but building may be beyond economical repair.	Significant strength remaining. Minor cracking of structural elements.	Same as Immediate Occupancy.	
Examples of Damage to Reinforced Masonry Buildings	Extensive cracking and crushing. Damage around openings at corners. Some fallen units. Transient drift to cause extensive nonstructural damage. Extensive permanent drift.	Major cracking distributed throughout wall. Some isolated crushing. Transient drift to cause nonstructural damage. Noticeable permanent drift.	Minor cracking. No out-of-plane offsets. Transient drift that causes minor or no nonstructural damage. Negligible permanent drift.	Same as Immediate Occupancy.	
Examples of Damage to Steel Framing	Extensive yielding and buckling of steel bracing members. Significant connection failures.	Many braces and beams yield or buckle but do not fail totally. Moderate amount of connection failures.	Minor deformation of steel members, no connection failures.	Same as Immediate Occupancy.	
Other General Description	Structure likely not repairable and not safe for reoccupancy due to potential collapse in aftershock.	Repair may be possible, but may not be economically feasible. Repairs may be required prior to reoccupancy.	Minor repairs may be required, but building is safe to occupy.	Same as Immediate Occupancy.	
Nonstructural Components	Extensive damage. Some exits blocked. Infills and unbraced parapets failed or at incipient failure.	Falling hazards mitigated, but many architectural, mechanical, and electrical systems are damaged.	Minor cracking of facades, partitions, and ceilings. Equipment and contents are generally secure, but may not operate due to lack of utilities.	Negligible damage. All systems important to normal operation are functional. Power and other utilities are available, possibly from standby sources.	
Comparison with New Building Design	Significantly more damage and greater risk.	Somewhat more damage and slightly higher risk.	Much less damage and lower risk.	Much less damage and lower risk.	

¹Adapted from American Society of Civil Engineers, "Prestandard and Commentary for the Seismic Rehabilitation of Buildings," FEMA-356, Federal Emergency Management Agency, Washington, D.C., November 2000.

Performance, Safety, Reliability, and Construction Cost

The seismic performance, safety, and reliability of a facility must be weighed against the relative importance and construction costs associated with a facility. It is impractical for the average building to be seismically designed or retrofit to experience no damage following a major earthquake; however, steps can be taken to mitigate seismic hazards for new and existing structures.

Some facilities have more community importance or pose special risks to a community following an earthquake (for example hospitals, fire stations, or facilities housing highly toxic substances). It is reasonable that important facilities be designed or retrofit to a higher performance standard than the average structure. The relative importance of a facility must be weighed against the relative construction costs associated with facility construction. There are two types of construction costs associated with seismic hazards: the cost of initial construction or seismic retrofit construction and the cost to repair or replace a facility following an earthquake. The better a structure performs during an earthquake, the faster the structure can be returned to service and the lower the repair costs will be following the earthquake. So, expected building damage states during a seismic event can be directly linked to:

- 1. Repair/Replacement Costs Cost of restoring the facility to pre-earthquake condition.
- 2. Public Safety Number of critical injuries and casualties to building occupants.
- 3. Downtime Length of time taken to make repairs to return a structure to service.

Figure 2 displays a graphic showing estimated performance-related consequences compared with different increasing post-earthquake structural damage states (which correspond to the design Structural Performance Levels for a given seismic hazard).

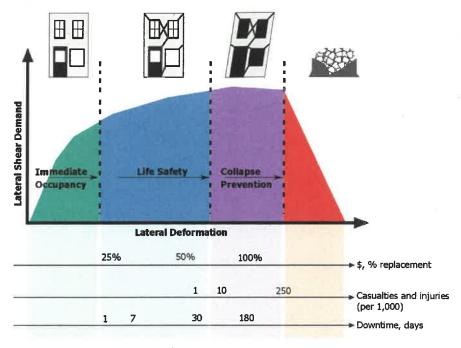


Figure 2. Estimated Performance-Related Consequences at Different Structural Performance Levels².

Figure 3 presents the schematic relationship between different retrofit building performance objectives and probable retrofit program cost.

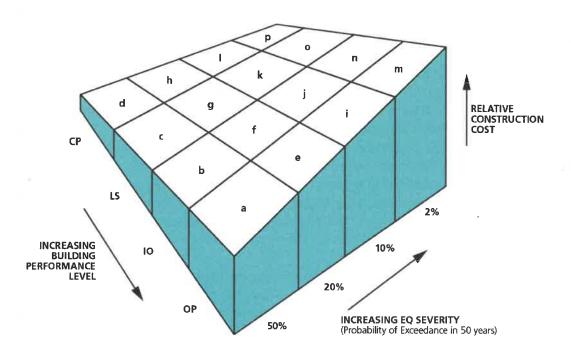


Figure 3. Surface Matrix of ASCE 41 Building Performance Levels Compared with Construction Cost³.

Seismic Evaluation Procedure

The current standard for seismic evaluation and retrofit of existing buildings is the ASCE 41-17, Seismic Evaluation and Retrofit of Existing Buildings. ASCE 41-17 provides screening and evaluation procedures used to identify potential seismic deficiencies that may require further investigation or hazard mitigation. It presents a three-tiered review process, implemented by following a series of predefined checklists and "quick check" structural calculations. Each successive tier is designed to perform an increasingly refined evaluation procedure for seismic deficiencies identified in previous tiers in the process. See Figure 4 for a flow chart describing the evaluation process.

² J. Moehle, "A Framework for Performance-Based Earthquake Engineering," Proceedings from ATC 15-9, 10th US-Japan Workshop on the Improvement of Structural Design and Construction Practices, Applied Technology Council, Makena, Hawaii, 2003.

³ Adapted from Applied Technology Council, "NEHRP Commentary for the Seismic Rehabilitation of Buildings," FEMA-274, Federal Emergency Management Agency, Washington, D.C., October 1997.

TIER 1 - Screening Phase

- Checklists of evaluation statements to quickly identify potential deficiencies
- Requires field investigation and/or review of record drawings
- Analysis limited to "Quick Checks" of global elements
- May proceed to Tier 2, Tier 3, or rehabilitation design if deficiencies are identified

TIER 2 - Evaluation Phase

- "Full Building" or "Deficiency Only" evaluation
- Address all Tier 1 seismic deficiencies
- Analysis more refined than Tier 1, but limited to simplified linear procedures
- · Identify buildings not requiring rehabilitation

TIER 3 - Detailed Evaluation Phase

- Component-based evaluation of entire building using reduced ASCE 41 forces
- Advanced analytical procedures available if Tier 1 and/or Tier 2 evaluations are judged to be overly conservative
- Complex analysis procedures may result in construction savings equal to many times their cost

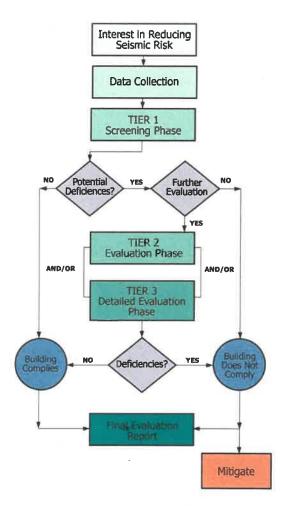


Figure 4. Flow Chart and Description of ASCE 41-17 Seismic Evaluation Procedure.

The Tier 1 checklists in ASCE 41-17 are specific to each common building type and contain seismic evaluation statements based on observed structural damage in past earthquakes. These checklists screen for potential seismic deficiencies by examining the lateral force-resisting systems (LFRS) and details of construction that have historically caused poor seismic performance in similar buildings. Tier 1 screenings include basic "Quick Check" analyses for primary components of the lateral system: in this building's case, the shear walls and wall anchorage. They also include prescriptive checks for proper seismic detailing of connections, diaphragm spans and continuity, and overall system configuration. Tier 2 evaluations then follow with additional calculations and assessments to either confirm the potential deficiencies identified in the Tier 1 review or demonstrate their adequacy. A Tier 3 evaluation involves an even more detailed analysis and advanced computations to review each structural component's seismic demand and capacity. It is similar in scope and complexity to the types of analyses often required to design a new building in accordance with the International Building Code (IBC), with a comprehensive analysis aimed at evaluating each component's seismic performance. As indicated in the Scope of Services, this evaluation includes a Tier 1 screening.

Seismic Retrofit Procedure

If seismic deficiencies are identified in the evaluation process, the owner and design team should review all initial conditions before proceeding with the hazard mitigation. Many conditions may affect the retrofit design significantly, such as results of the seismic evaluation and seismic hazard study, building use and occupancy requirements, presence of hazardous materials, and other anticipated building remodeling. The basic process for performance-based retrofit design is illustrated in Figure 5.

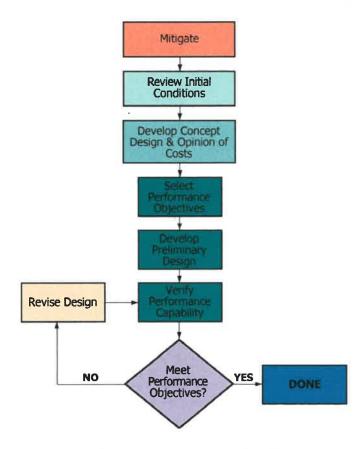


Figure 5. Seismic Rehabilitation Flow Diagram.

Following the review of initial conditions, concept designs may be performed to develop rough opinions of probable construction costs for one or more performance objectives. The owner and design team can then develop a rehabilitation strategy considering the associated costs and feasibility. Schematic and final design can then proceed through an iterative process until verification of acceptable building performance is obtained.

Limitations

The professional services described in this report were performed based on available as-built information and limited observation of the structure. No destructive testing was performed to qualify as-built conditions or verify the quality of materials and workmanship. No other

warranty is made as to the professional advice included in this report. This report provides an overview of the seismic evaluation results and proposed upgrades and does not address programming and planning issues.

This report has been prepared for the exclusive use of Rice Fergus Miller Architecture & Planning and Central Kitsap Fire and Rescue. It is not intended for use by other parties, nor may it contain sufficient information for purposes of other parties or their uses. This report does not address any portion of the structure other than those areas mentioned, nor does it provide any warranty, either expressed or implied, for any portion of the existing structure.

Fire Station 41

Building Description

Year Built:

1978

Number of Stories:

1, with basement

Floor Area:

13.500 SF



Fire Station 41 is a one-story, wood-framed structure with a concrete below-grade basement. The building site is located on Old Military Rd NE, west of Washington State Route 303, and slopes downhill from south to north. The building is irregular in shape, with a below-grade level on the north side of the structure. The overall dimensions of the building footprint are approximately 100 feet by 145 feet. The ridge height of the roof above the apparatus bay is 21 feet, while the ceiling height of the surrounding areas is approximately 8.5 feet. A hose tower in the southeast corner of the building rises to a height of approximately 27 feet. The main level of the structure consists of glulam beams, I-joists, and wood structural-panel diaphragms supported by wood shear walls and concrete retaining walls. The exterior walls of the main level support a brick veneer. The basement consists of a wood-framed flooring system supported by concrete retaining walls. The hose tower is constructed of a flexible wood-framed diaphragm supported by concrete masonry unit (CMU) walls and concrete retaining walls. The foundation system consists of strip footings throughout the structure.

Structural Site Observations

Reid Middleton conducted a site visit of Station 41 on February 15, 2019. No significant damage was noted during the evaluation of the structure. A structural drawing set was available for this evaluation and most conclusions were determined through a combination of site investigation and drawing details. ASCE 41-17 classifies most of Station 41 as a wood-frame building (commercial and industrial), W2. The hose tower in the southeast corner of the structure is classified as a reinforced masonry building with flexible diaphragms, RM1. The structure was checked against IO criteria. The Tier 1 Preliminary Seismic Evaluation structural checklists for both wood (W2) and reinforced masonry (RM1) structures were completed and are included for reference.

Structural System

The following table describes the structural system for Fire Station 41.

Structural System Description of Fire Station 41

System	Description
Roof	Plywood-sheathed roofing supported by glulam beams, wood I-joists, and dimensional lumber, primarily supported by wood bearing walls. Some wood bearing walls are supported by concrete basement retaining walls.
4-inch to 5 1/2-inch slab on grade where applicable. 2x12 mer 16-inches on center supporting 5/8-inch plywood subfloor with lightweight concrete topping above basement level. Perimeter walls and interior wood posts provide vertical support for the fat the partial below-grade basement.	
Foundations	The building's foundation system consists of basement concrete foundation walls supported on strip footings.
Lateral System	The primary lateral system consists of wood-frame plywood diaphragms supported by wood shear walls in the transverse and longitudinal directions.
Hose Tower	Plywood-sheathed roofing supported by dimensional lumber, supported by reinforced masonry shear walls on concrete basement walls. Intermediate steel, partial-width platforms are present at two locations.

Seismic Evaluation Findings

Seismic Deficiencies

The following table summarizes the seismic deficiencies identified during the Tier 1 evaluation. Descriptions of these deficiencies are based on this evaluation.

Identified Seismic Deficiencies for Fire Station 41

Deficiency	Description	
Redundancy	The west walls of the apparatus bay do not meet minimum aspect ratios for wood walls and therefore cannot be considered part of the lateral system. This leaves only one line of shear walls in the principal direction of the apparatus bay. Without multiple lines of resistance, increased lateral loads can be applied to seismic elements beyond which they were originally designed.	

Deficiency	Description	
Shear Stress Check	The shear stress is exceeded in the transverse direction of the apparatus bay. The walls may not have adequate strength to resist seismic forces.	
Narrow Wood Shear Walls	Shear walls on the northwest face of the building and on the west wall of the apparatus bay have aspect ratios larger than 2:1. Walls with large aspect ratios are likely to be highly stressed and subject to severe deformations that reduce capacity.	
Openings	The west wall of the apparatus bay has openings that exceed more than 80 percent of the wall length. Collectors are typically required to transfer forces around the openings to adjacent lateral systems.	
Hold-Down Anchors	No hold-down anchors are indicated on record drawings of the structure. Hold-downs are required to prevent uplift and racking of shear walls, which can be damaging.	
Diagonally Sheathed and Unblocked Diaphragms	The unblocked diaphragm above the apparatus bay spans more than 30 feet. Unblocked diaphragms have less capacity due to the potential of joist rolling and inability for direct shear transfer to unsupported panel edges.	
Wall Anchorage	Connections between the shear walls and diaphragm do not have adequate capacity to prevent out-of-plane deflection of the walls.	
Overturning	The hose tower has a base/height less than the 0.6S _a value of 0.73. The low base/height ratio can cause high overturning forces in the foundation elements or exceed soil capacities.	
Redundancy	Discontinuity of the lateral load path in the north wall of the hose tower, caused by windows, results in the shear wall not receiving seismic loads. Without multiple lines of resistance, the seismic forces are not distributed uniformly and the increased shear and flexure applied to any one element can cause failure.	
Wood Ledger Connections	At the hose tower, the connection between the diaphragm and walls induces cross-grain bending in the wood ledgers. Failure of such a connection is sudden and nonductile and can result in collapse of roofs and walls.	
Transfer to Shear Walls	The hose tower diaphragm is not connected adequately for transfer of seismic force to the shear walls.	
Proportions	The height to thickness of the hose tower walls exceeds the maximum allowable. Slender walls are susceptible to out-of-plane forces and magnified moments.	

Deficiency	Description
Stiffness of Wall Anchor	The connections between the masonry walls and wood diaphragm of the hose tower has limited stiffness. Deflection at the connections can cause the load path to redistribute and cause damage to members not intended to be part of the lateral force-resisting system.

There are several instances where the compliance of an aspect of the building could not be concluded with certainty given the available resources. Assumptions can be made about some of these to suggest compliance. There was no geotechnical report provided for the site in question, causing checklist items involving soil to be marked as "unknown." It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be done for verification. Openings in reinforced masonry shear walls typically have trim reinforcement around them. This was not confirmed due to field investigation limitations and lack of details on drawings, but is expected to be the case at the hose tower door.

Structural Recommendations and Conclusions

Fire Station 41 does not meet the IO performance objective, as determined by the ASCE 41 Tier 1 Evaluation. This evaluation indicates damage to the building may occur during a design-level earthquake that may cause the facility to be un-occupiable after the event. Collapse of the structure poses a risk to building occupants and limits the building's ability to remain functional and provide first-response capabilities. It is recommended that the building be replaced or upgraded to meet the IO performance objective to allow the station to remain functional after an earthquake and provide first response capabilities.

The masonry hose tower poses a serious falling hazard, causing more damage to the building and its occupants. The existing hose tower should be removed above the roof line to reduce the weight of the structure, attracting less earthquake forces and eliminating a dangerous falling hazard.

Specified interior and exterior walls should be resheathed with structural sheathing, which will strengthen the existing shear walls and increase shear capacity of the LFRS. Hold-downs should also be added to strengthen and stiffen the building.

Additional nailing and blocking should be added to the roof to increase the roof diaphragm's capacity and strength. The connection between the diaphragm and shear walls should also be improved using roof wall ties to ensure that forces are transferred to the shear walls.

The lateral system at the apparatus bay doors should be improved. Multiple options can be utilized, including adding steel moment-frames around the doors to provide a lateral load path and prevent possible significant damage to this wall during a design-level earthquake. New steel columns as part of the steel moment-frame will require new concrete spread footings. A second

option, shown in the schematic concepts, is to brace the wall laterally and drag the load with new framing from the apparatus bay into walls in the portions of the station that flank the apparatus bay. Specified walls in the flanking sides would need to be upgraded, including sheathing, hold-downs, and new footings.

For additional information on the building's performance objectives and evaluation criteria, see the section titled *Existing Fire Station Seismic Evaluation Criteria*. Plans included in the appendix display schematic-level upgrade concepts for Fire Station 41 to improve the LFRS and meet the IO performance objective. These concepts, based on engineering judgment, were developed by addressing the seismic deficiencies noted in the ASCE 41 Tier 1 checklist. The upgrade concepts involve strengthening existing shear walls, roof upgrades, improving connections, and the distribution of loads at the apparatus bay openings. The addition of these new elements will strengthen and stiffen the building, providing better seismic performance.

Fire Station 41 Training Tower

Building Description

Year Built:

Unknown

Number of Stories:

3

Floor Area:

750 SF



The Fire Station 41 Training Tower is a three-story, concrete masonry structure. The building is located on Old Military Rd NE, west of Washington State Route 303, on the grounds of Fire Station 41 of the Central Kitsap Fire and Rescue. The structure is rectangular at every level, measuring approximately 20 feet by 10 feet in dimension. The second story is approximately 8 feet tall and contains several windows and a diaphragm opening for metal stairs. The third story is approximately 17 feet from the foundation and resembles the second story, with the addition of a door and metal balcony on the east face of the structure. The flat roof of the building is 26 feet above the foundation and includes a small stair access and parapet. Building construction consists of concrete diaphragms, supported by steel framing and reinforced CMU walls. The roof and third level of the structure both consist of cast-in-place concrete on metal deck diaphragms supported by steel framing, while the second level consists of a cast-in-place concrete diaphragm supported directly by the CMU walls. The foundation of the structure consists of strip footings.

Structural Site Observations

Reid Middleton conducted a site visit of the Station 41 training tower on February 15, 2019, as part of this seismic evaluation. The reinforced masonry structure was visible during the site visit and no significant concrete cracking was observed. The steel members supporting the floor and stair components were unprotected and had corrosion buildup which appeared to be due to water exposure. Conclusions were developed through examination of architectural drawings and limited site investigation. ASCE 41-17 classifies the Station 41 training tower as having reinforced masonry walls with stiff diaphragms, RM2. This structure was checked against both Collapse Prevention (CP) and Immediate Occupancy (IO) performance criteria. The Tier 1 Seismic Evaluation structural checklists were completed and are included for reference.

Structural System

The following table describes the structural system of the Training Tower at Fire Station 41.

Structural System Description of Fire Station 41 Training Tower

System	Description
Roof	Cast-in-place concrete on metal deck supported by steel framing and masonry walls.
Foundations	The building's foundation system consists of strip footings.
Floors	The first floor consists of a cast-in-place elevated concrete slab supported by the masonry walls. The second floor is composed of a cast-in-place concrete on metal deck, supported by steel framing.
Lateral System	Rigid cast-in-place concrete diaphragms and reinforced masonry shear walls provide lateral support in both the transverse and longitudinal directions.

Seismic Evaluation Findings

Seismic Deficiencies

The following table summarizes the seismic deficiencies identified during the Tier 1 evaluation. Descriptions of these deficiencies are based on this evaluation.

Identified Seismic Deficiencies for Fire Station 41 Training Tower

Deficiency	Description	
Overturning	The building has a base/height ratio 0.44, which is less than the 0.6S _a value of 0.73. The low base/height ratio can cause high overturning forces in the foundation elements or exceed soil capacities. This check is noncompliant for both IO and CP. Diaphragm openings for the stairwells run immediately adjacent to shear walls for more than 25% the length of the walls. Large openings can reduce the ability of the diaphragm to transfer seismic loads to the walls. This check is noncompliant for both IO and CP.	
Openings at Shear Walls		
Openings at Exterior Masonry Shear Walls	Diaphragm openings for the stairwells running immediately adjacent to the exterior masonry shear walls are 11 feet 2 inches long. This exceeds the 8-foot limit for CP and the 4-foot limit for IO. This limits the ability of the diaphragm to provide out-of-plane support.	

A geotechnical investigation was not completed as part of the evaluation; therefore, the checks for Liquefaction and Surface Fault Rupture are marked as "unknown" for both the IO and CP checklists. Although not part of the Tier 1 evaluation, it was noted that the steel members supporting the floor and stair components were unprotected and had corrosion buildup. This appeared to be due to water exposure. It is recommended that the steel be cleaned, galvanized and maintained to prevent further deterioration.

Structural Recommendations and Conclusions

The Fire Station 41 Training Tower does not meet the IO or CP performance objectives, as determined by the ASCE 41 Tier 1 Evaluation. These evaluations indicate damage to the building may occur during a design-level earthquake that may cause the facility to be unusable after the event. As the structure is not a fully occupied building, is used for training, and is not required to remain functional to provide first-response capabilities after a seismic event, it is recommended that the Training Tower follow the CP performance objective. For additional information on the building's performance objectives and evaluation criteria, see the section titled *Existing Fire Station Seismic Evaluation Criteria*.

Based on the identified deficiencies, a more detailed seismic evaluation of the structure, may show that the building complies with the CP performance objective. It is recommended that the building undergo a more detailed Tier 2 Evaluation in compliance with ASCE 41-17, to determine if the deficiencies noted in the checklists can be reconciled. A Tier 2 evaluation would include additional calculations and assessments to either confirm the potential deficiencies identified in the Tier 1 review or demonstrate their adequacy. If the deficiencies noted in the checklists cannot be reconciled, the building should be retrofitted based on the findings of the more detailed evaluation.

APPENDIX A: ASCE 41-17 SCREENING CHECKLISTS – FIRE STATION 41

17-1 Very Low Seismicity Basic Configuration Checklist

Very Low Seismicity Checklist

Structural Components

С	NC	N/A	υ	EVALUATION STATEMENT	COMMENT
	x			LOAD PATH: The structure contains 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)	This is only NC for the hose tower: Windows in the north wall creates an undesirable load path where forces are not transferred as intended. This check is C for the remainder of the building.
	X			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)	This is only NC for the hose tower: Connections between the shear walls and diaphragm do not have adequate capacity to prevent out of plane deflection of the walls. This check is N/A for the remainder of the building.

17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	This is only NC for the hose tower: Windows in the north wall creates an undesirable load path where forces are not transferred as intended. This check is C for the remainder of the building.
		x		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismici ty, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
		x		MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System – Building Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
		X		SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
		x		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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
		x		MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	บ	EVALUATION STATEMENT	COMMENT
			x	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	Geotechnical reports were not available for soil information.
		x		SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			x	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	Geotechnical reports were not available for soil information.

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	This is only NC for the hose tower: (Base/Height) = 8.83'/27' (0.6*S _a) = 0.734 0.33 < 0.734 This check is C for the remainder of the building.
			х	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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	This is only U for the hose tower: Footings are restrained only by soils classified as Site Class D. This check is C for the remainder of the building.

17-7. Immediate Occupancy Checklist for Building Type W2

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	Aspect ratios of the west walls of the apparatus bay do not meet minimum standards and therefore cannot be considered part of the lateral system, leaving only one line of resistance in that direction.
	x			SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing, 1,000 lb/ft (14.6 kN/m); Diagonal sheathing, 700 lb/ft (10.2 kN/m); Straight sheathing, 100 lb/ft (1.5 kN/m); All other conditions, 100 lb/ft (1.5 kN/m). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec.A.3.2.7.1)	Shear stress is exceeded in the transverse direction of the apparatus bay. The walls may not have adequate strength to resist seismic forces.
		x		STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multistory buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.2)	
X				GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.3)	
	x			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	Shear walls on the north face of the building and in the apparatus bay have aspect ratios greater than 2:1.
		x		WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Tier 2: Sec. 5.5.3.6.2; Commentary: Sec. A.3.2.7.5)	
X				HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Tier 2: Sec. 5.5.3.6.3; Commentary: Sec. A.3.2.7.6)	
		x		CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Tier 2: Sec. 5.5.3.6.4; Commentary: Sec. A.3.2.7.7)	
	x			OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Tier 2: Sec. 5.5.3.6.5; Commentary: Sec. A.3.2.7.8)	The west wall of the apparatus bay has an openings exceeding 80% of the wall length. The shear walls on either side of the opening have aspect ratios greater than 1.5:1.
	x			HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices. (Tier 2: Sec. 5.5.3.6.6; Commentary: Sec. A.3.2.7.9)	There are no indications of hold-downs in the detail drawings.

17-7. Immediate Occupancy Checklist for Building Type W2

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD POSTS: There is a positive connection of wood posts to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.3)	
X				WOOD SILLS: All wood sills are bolted to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.4)	
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
X				SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: 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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (<i>Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4</i>)	Shear walls on the north face of the building and in the apparatus bay have aspect ratios greater than 1.5:1.

Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.1)	
х				ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.3)	
		x		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	
х				STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (<i>Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1</i>)	

17-7. Immediate Occupancy Checklist for Building Type W2

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
	x			DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.1 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	The diaphragm above the apparatus bay spans more than 30 ft. and there is no indication of blocking in the detail drawings.
x				OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less with acceptable edge and end distance provided for wood and concrete. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.7)	

Very Low Seismicity

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	The number of lines of shear walls is less than 2 as a result of the discontinuity of load path in the north wall.
X				SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in. ₂ (4.83 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	
x				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. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)	Connections between the shear walls and diaphragm do not have adequate capacity to prevent out of plane deflection of the walls.
	X			WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)	Connections between the shear walls and diaphragm induce cross-grain bending in the wood ledgers.
	x			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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)	Diaphragm is not connected adequately for transfer of seismic force to shear walls. See above.
			х	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. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	No connection specifications are available to check adequacy of development and strength.
		х		GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Stiff Diapghragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	
		x		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.3)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
x				SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			x	REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Tier 2: Sec. 5.5.3.1.5; Commentary: Sec. A.3.2.4.3)	Record drawings arenot available for reinforcement at wall openings. It is anticipated that this check is compliant, as standard construction includes reinforcing around openings.
	x			PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30. (Tier 2: Sec. 5.5.3.1.2; Commentary: Sec. A.3.2.4.4)	Height/Thickness = (27**12)/8** 40.5 > 30

Diapghragms (Stiff or Flexible)

С	ŅC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	There are no openings in the roof diaphragm.
		x		OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	There are no openings in the roof diaphragm.

С	NC	N/A	υ	EVALUATION STATEMENT	COMMENT
		PLAN IR the streng locations Comment DIAPHR X reinforcir the buildi	PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)		
		x		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	

Flexible Diapghragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)	Dimensional lumber acts as continuous cross ties between diaphragm chords.
X				STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	
X				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	Plywood is used as sheathing.
X				DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	Spans are less than 30' and the maximum aspect ratio is 1.5:1.
		х		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 (12.2 m) and have aspect ratios less than 4-to-1. (Tier 2: Sec. 5.6.3; Commentary: Sec. A.4.3.1)	,
		x		OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			masonry walls to wood structural elements are installed taut and	The connections between the masonry walls and wood diaphragm of the hose tower has limited stiffness.

APPENDIX B: ASCE 41-17 SCREENING CHECKLISTS – TRAINING TOWER

17-1 Very Low Seismicity Basic Configuration Checklist

Very Low Seismicity Checklist

Structural Components

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x		×		LOAD PATH: The structure contains 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)	
x				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)	

17-2 Collapse Prevention Basic Configuration Checklist

Low Seismicity

Building System—General

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.10)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.25% of the height of the shorter building in low seismicity, 0.5% in moderate seismicity, and 1.5% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
		х		MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System—Building Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
x				SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	,
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
x				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
x				MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
x				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-2 Collapse Prevention Basic Configuration Checklist

Moderate Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	NC		х	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	Information on site soils was not available.
		x		SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			x	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.3)	Information on site soils was not available.

High Seismicity

(Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	(Base/Height) = 0.44 (0.6*S _a) = 0.734 0.44 < 0.734
x				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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

17-34 Collapse Prevention Structural Checklist for Building Types RM1 and RM2

Low and Moderate Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
x				SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in. ² (0.48 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	
х				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. (1220 mm), and all vertical bars extend to the top of the walls. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)	

Stiff Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)	
		x		WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)	·
X				TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)	
		x		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.)	
X				FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	

17-34 Collapse Prevention Structural Checklist for Building Types RM1 and RM2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		GIRDER—COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

High Seismicity

(Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)

Stiff Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	Stairwell openings in the diaphragms run immediately adjacent to the exterior shear walls for more than 25% of the wall length.
	x			OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	Stairwell openings in the diaphragms run immediately adjacent to the exterior shear walls for 11 ft 2 in.

Flexible Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)	
		x		OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	
		x		OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	
		x		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	·
		x		SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	-i
		x		DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and aspect ratios less than or equal to 4-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
		x		OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

17-34 Collapse Prevention Structural Checklist for Building Types RM1 and RM2

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		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. (3 mm) before engagement of the anchors. (Tier 2: Sec. 5.7.1.2; Commentary: Sec. A.5.1.4)	

17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		x		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismici ty, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
		х		MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System – Building Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
X				SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	•
х				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
x				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
x				MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
x				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			X	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	Information on site soils was not available.
		x		SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			x	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	Information on site soils was not available.

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	х			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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	(Base/Height) = 0.44 (0.6*S _a) = 0.734 0.44 < 0.734
x				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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Very Low Seismicity

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
х				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
x				SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in. ₂ (4.83 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	
х				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. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)	

Connections

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		x		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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)	
		x		WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)	
x				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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)	
X				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. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	
		х		GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Stiff Diapghragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	
		x		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.3)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT .	COMMENT
		x		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
		х		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Tier 2: Sec. 5.5.3.1.5; Commentary: Sec. A.3.2.4.3)	
x				PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30. (Tier 2: Sec. 5.5.3.1.2; Commentary: Sec. A.3.2.4.4)	Height/thickness = (8*12)/5.625 17.06 < 30

Diapghragms (Stiff or Flexible)

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	Stairwell openings in the diaphragms run immediately adjacent to the exterior shear walls for more than 15% of the wall length.
	х			OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	Stairwell openings in the diaphragms run immediately adjacent to the exterior shear walls for 11 ft 2 in.
		· X		PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)	

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	

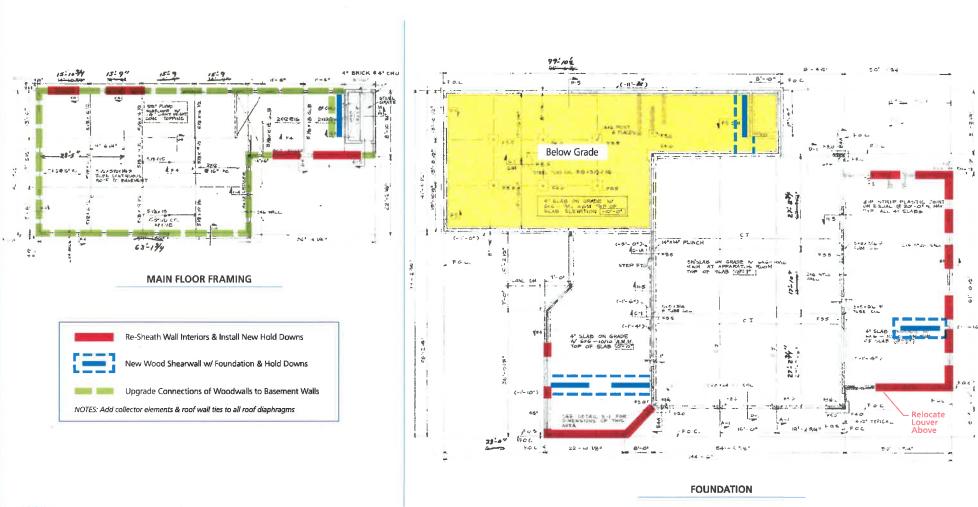
Flexible Diapghragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)	
		x		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	
		x		SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
		x		DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
		х		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 (12.2 m) and have aspect ratios less than 4-to-1. (Tier 2: Sec. 5.6.3; Commentary: Sec. A.4.3.1)	
		x		OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

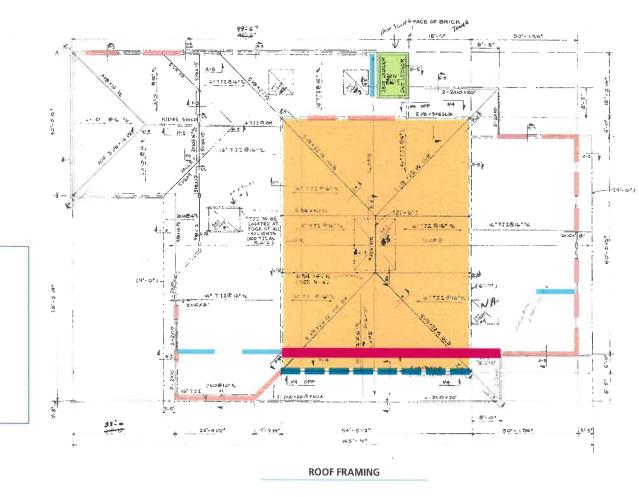
Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
Ð		x		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. (Tier 2: Sec. 5.7.1.2; Commentary: Sec. A.5.1.4)	

APPENDIX C: FIRE STATION 41 UPGRADE CONCEPTS



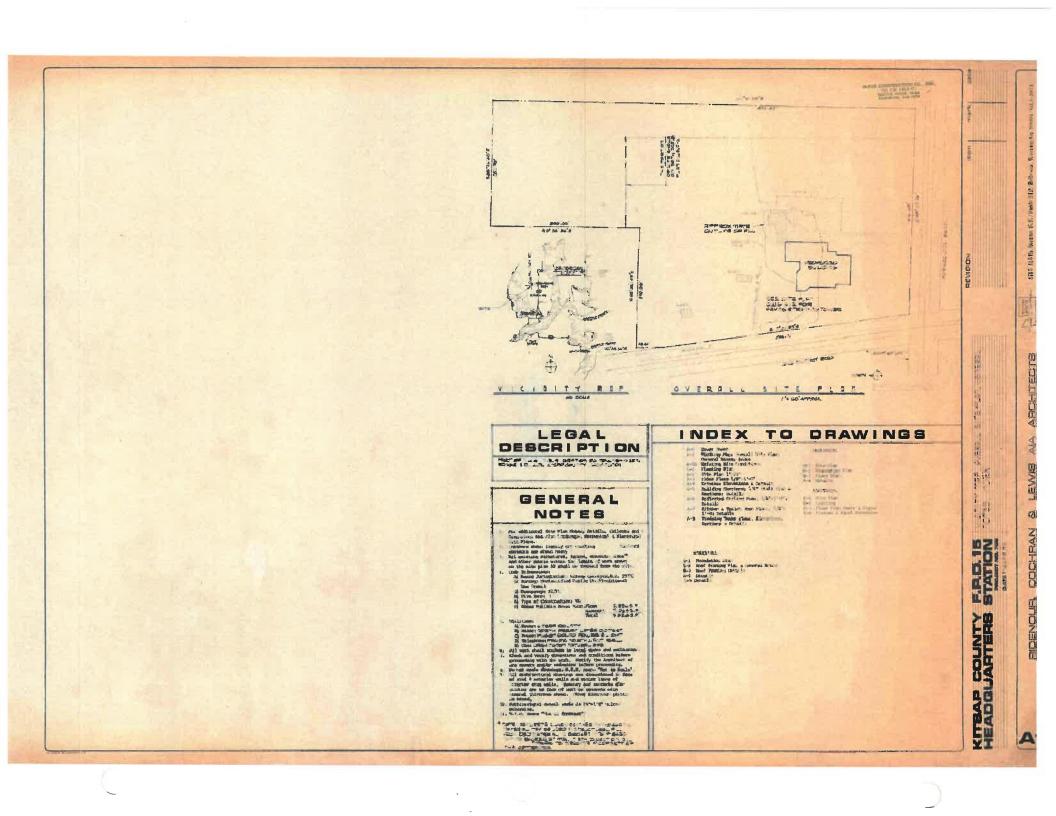


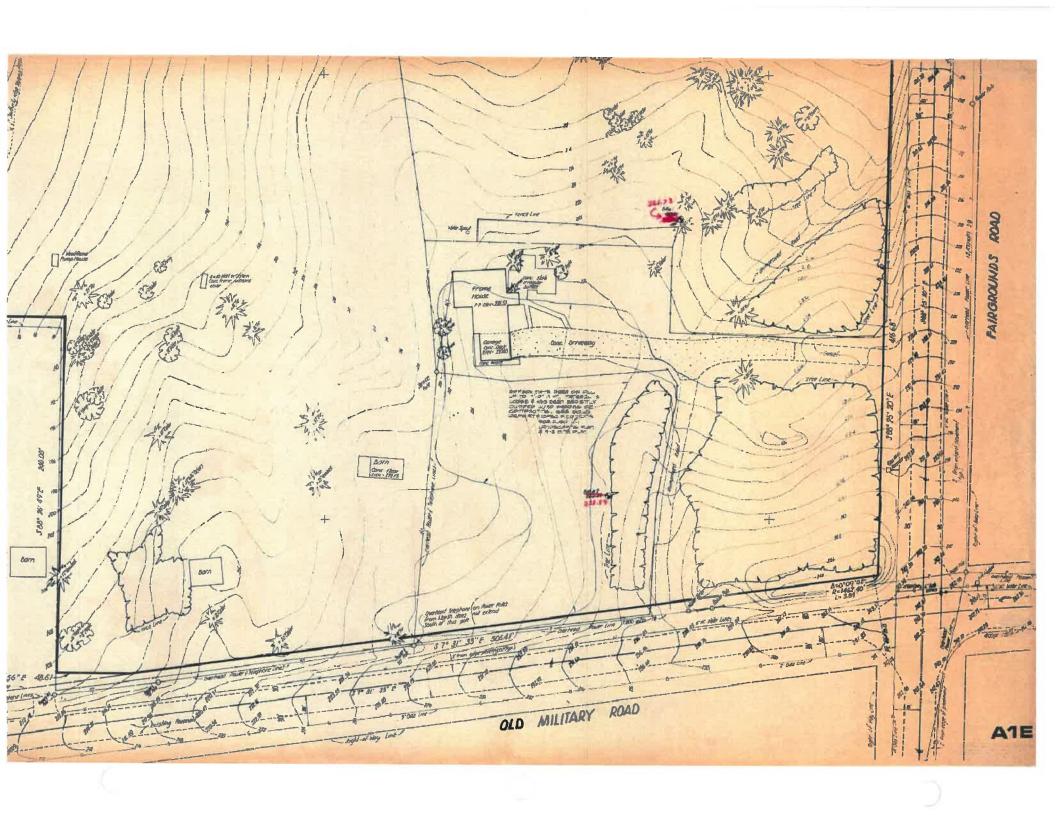


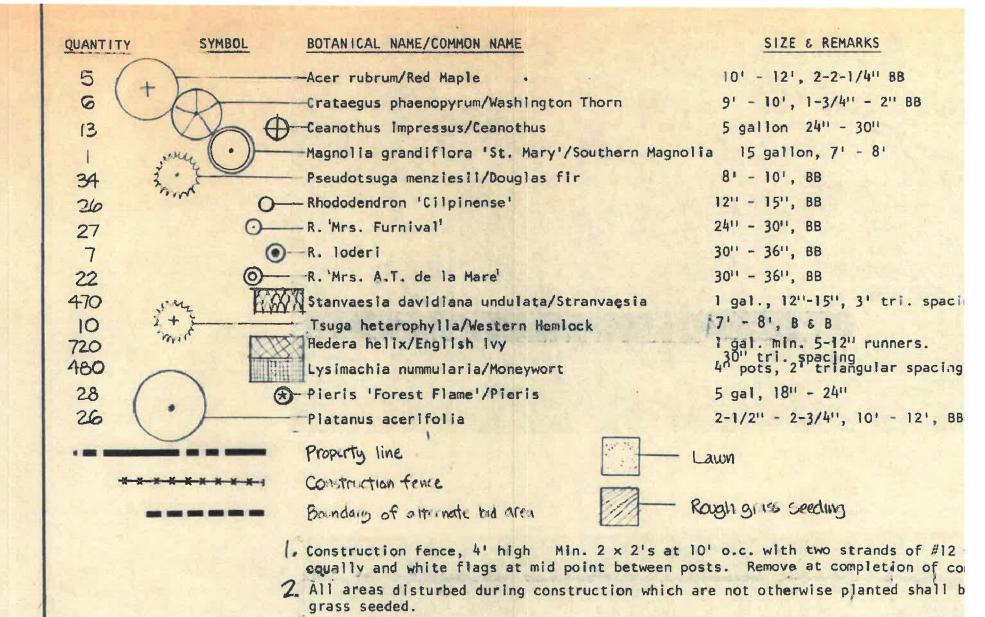


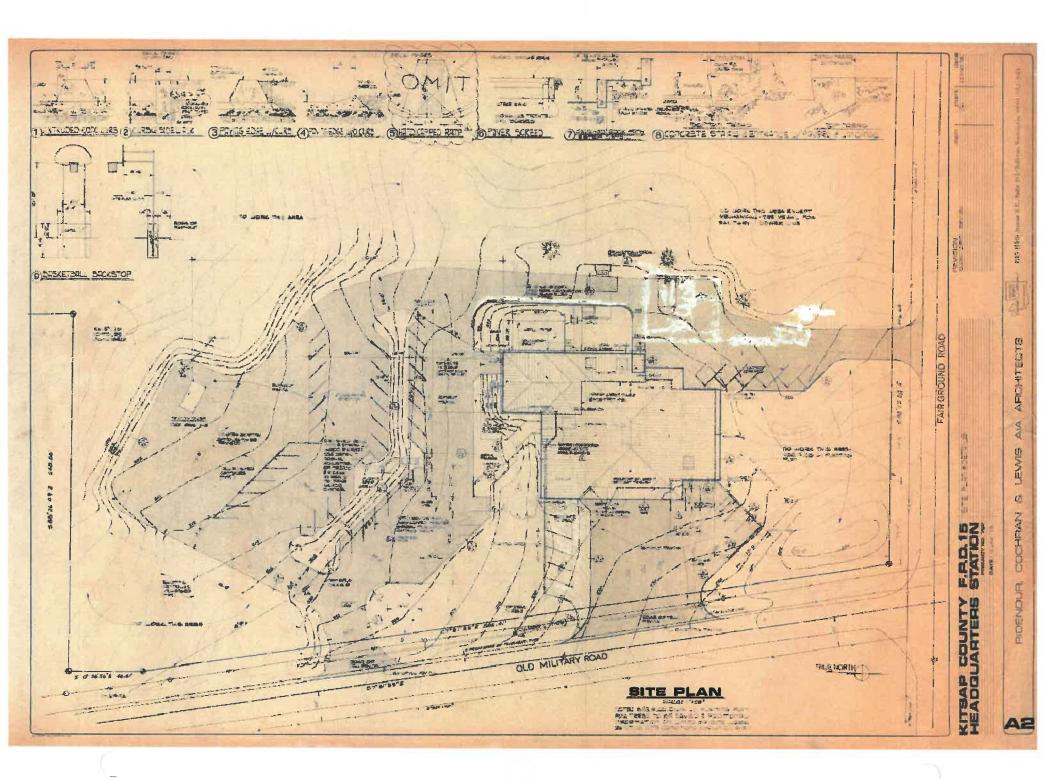


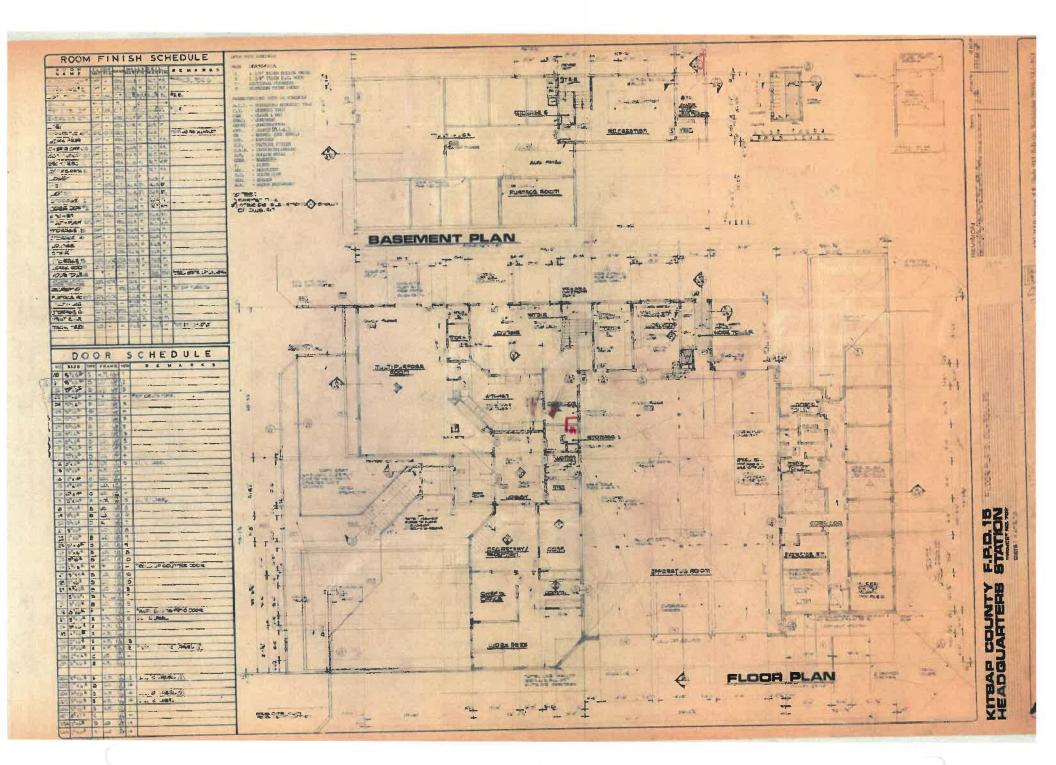
KITSAP COUNTY F.P.D. 15 HEADQUARTERS STATION

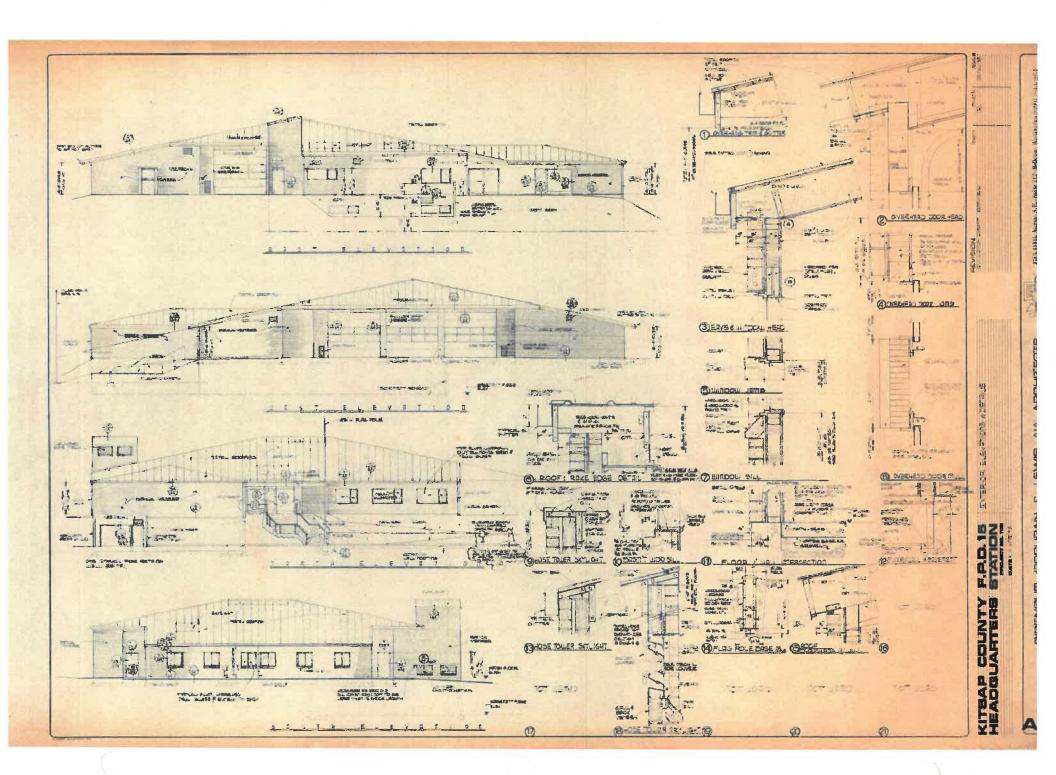


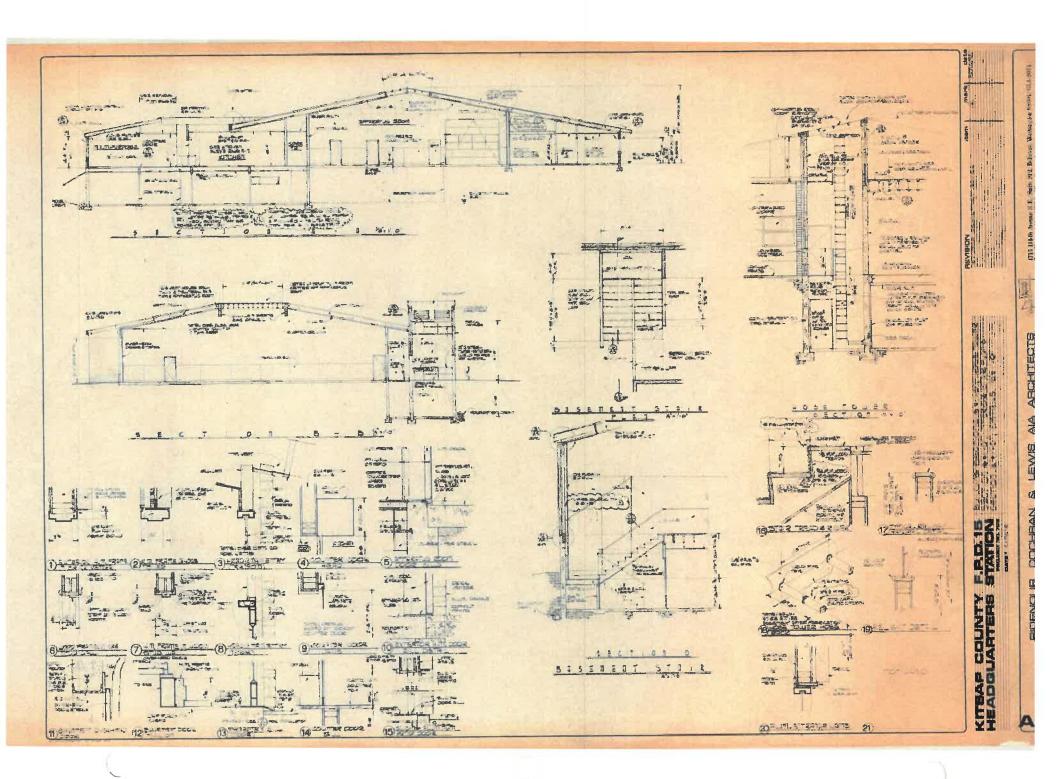


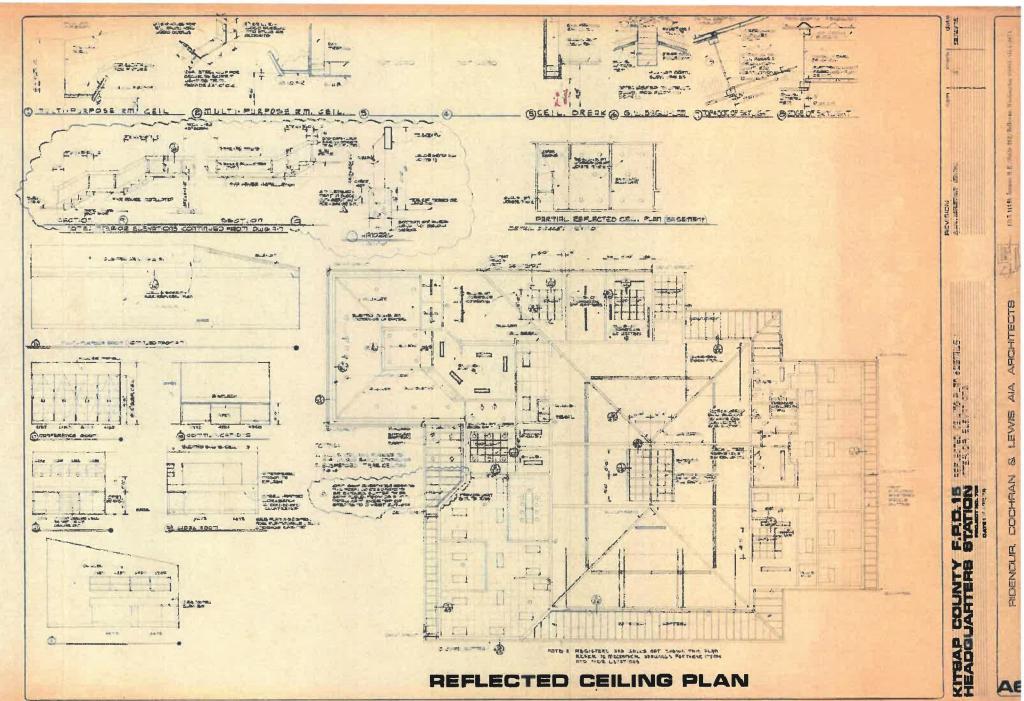


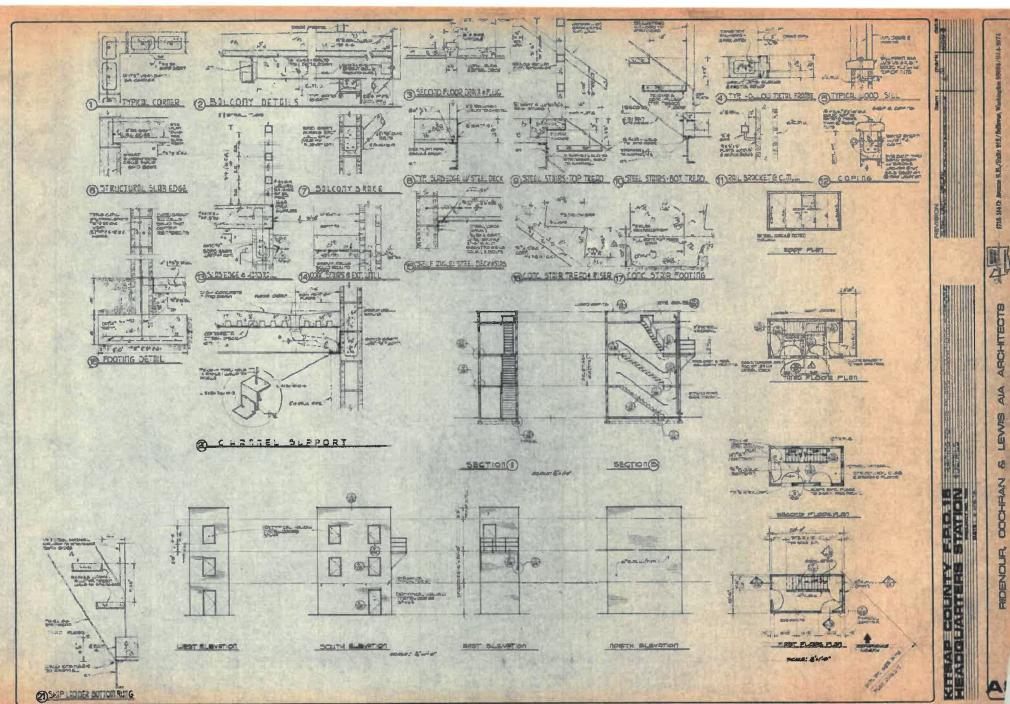


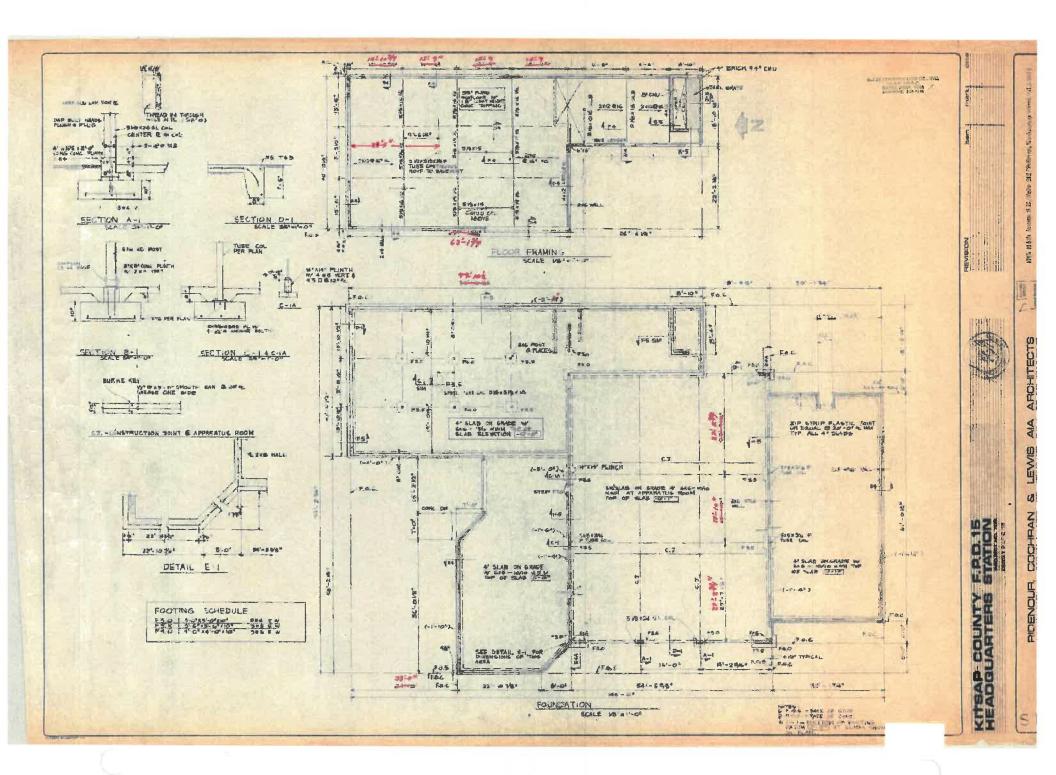








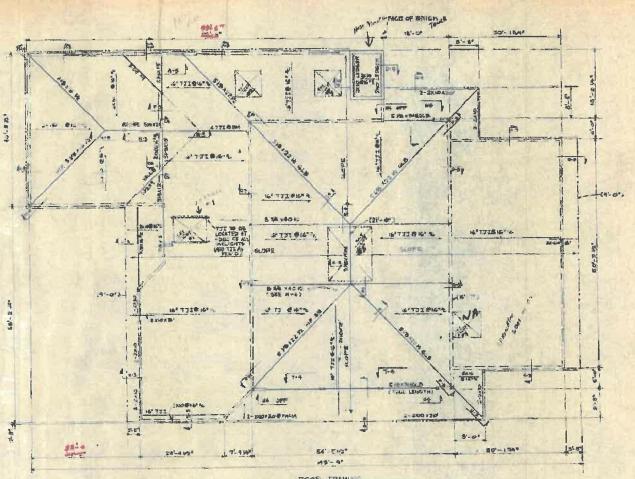












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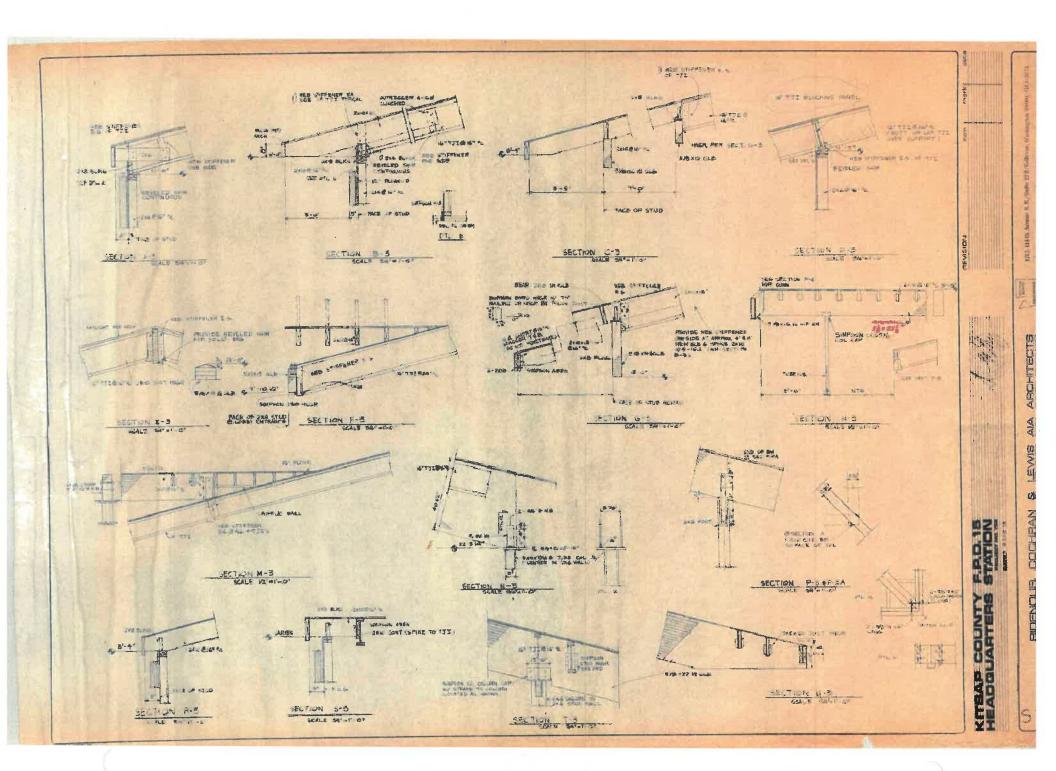
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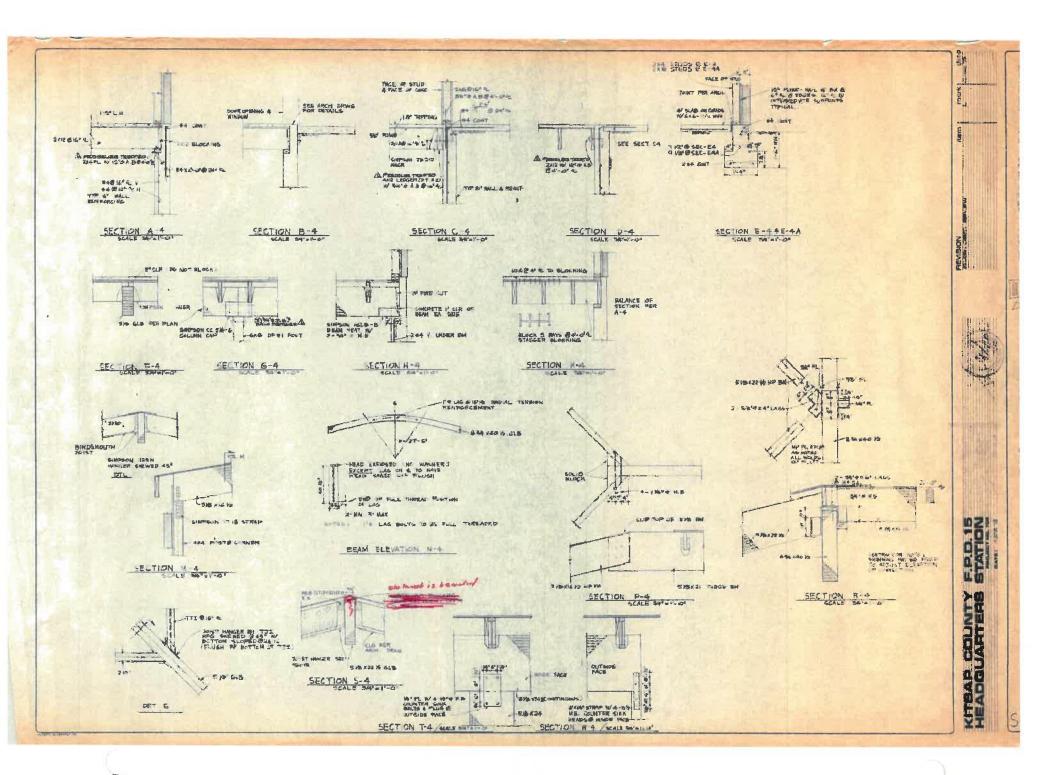
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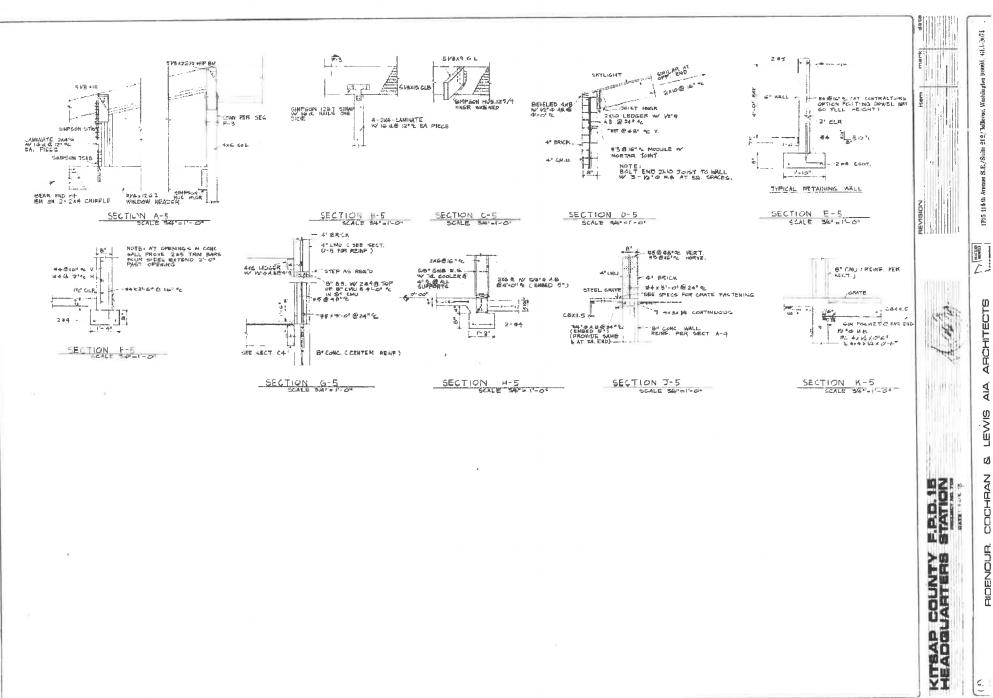
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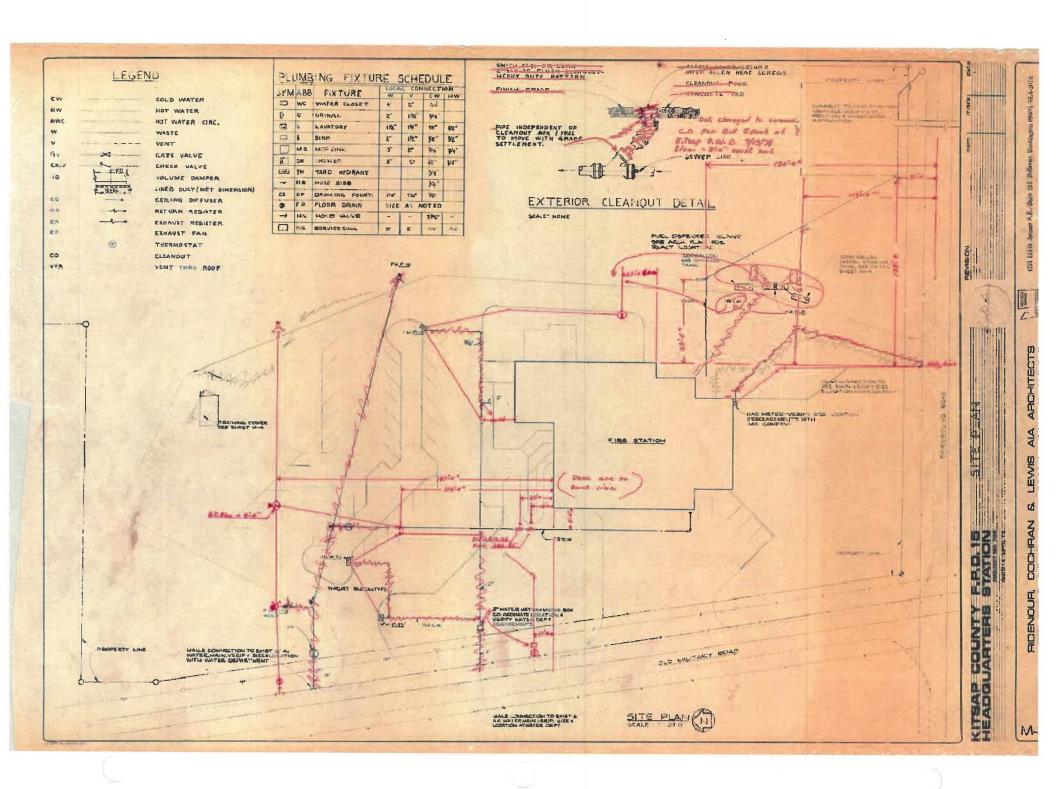


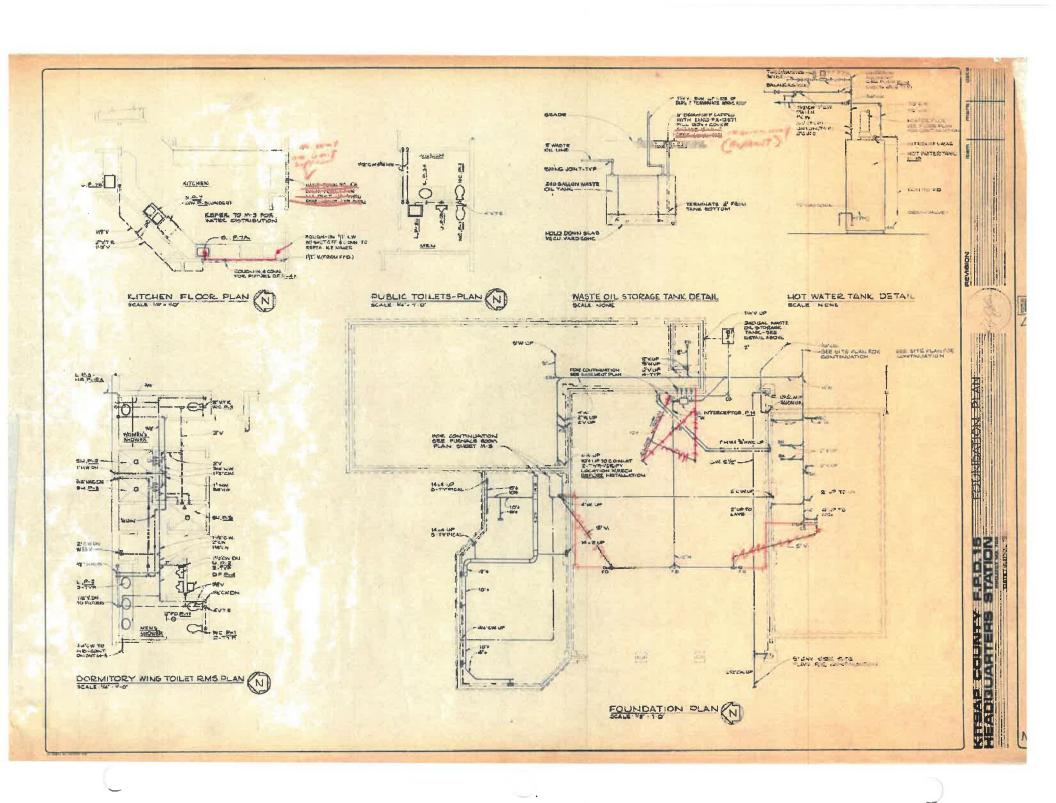


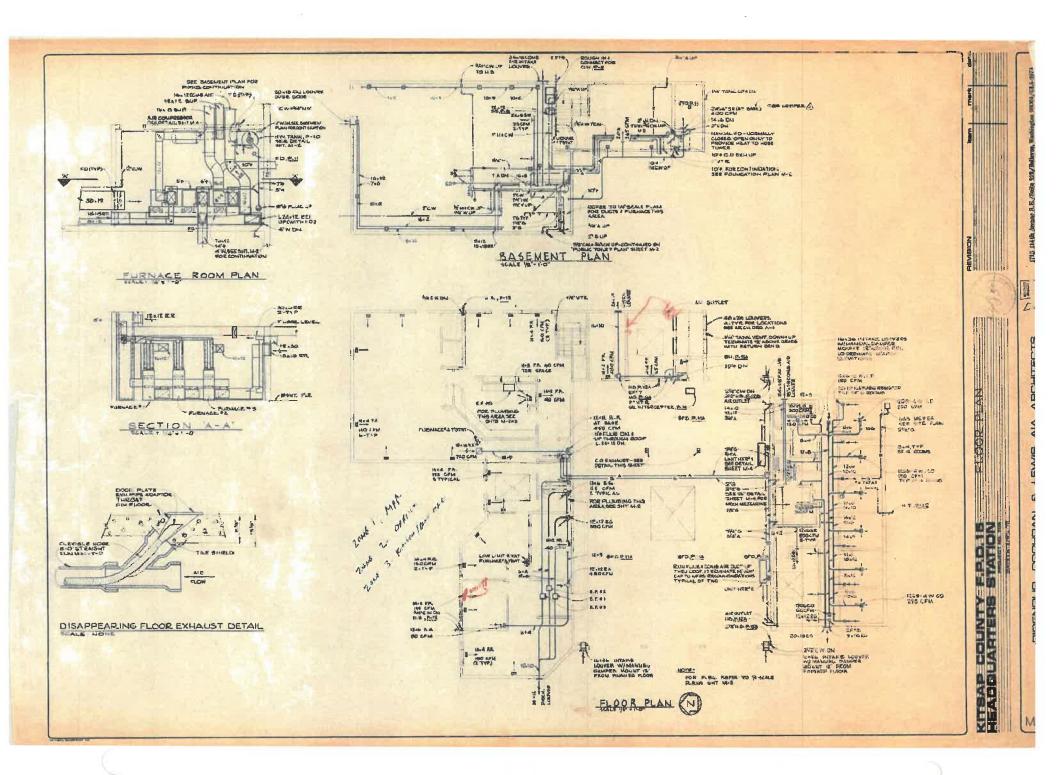


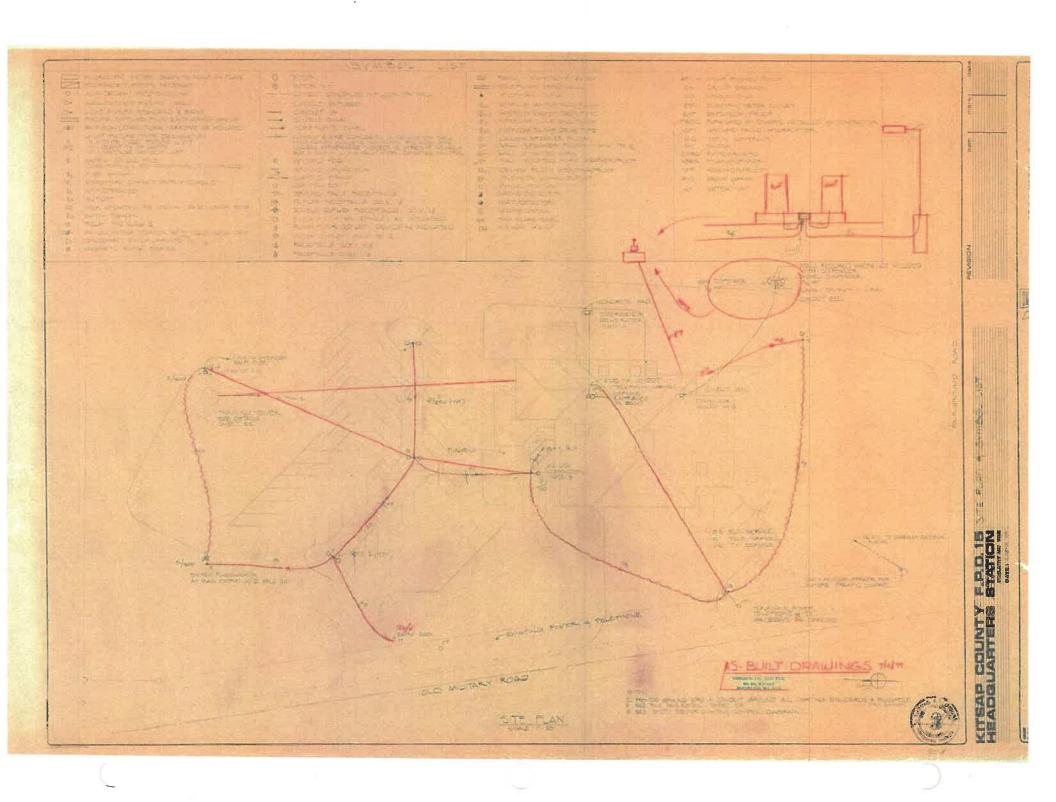
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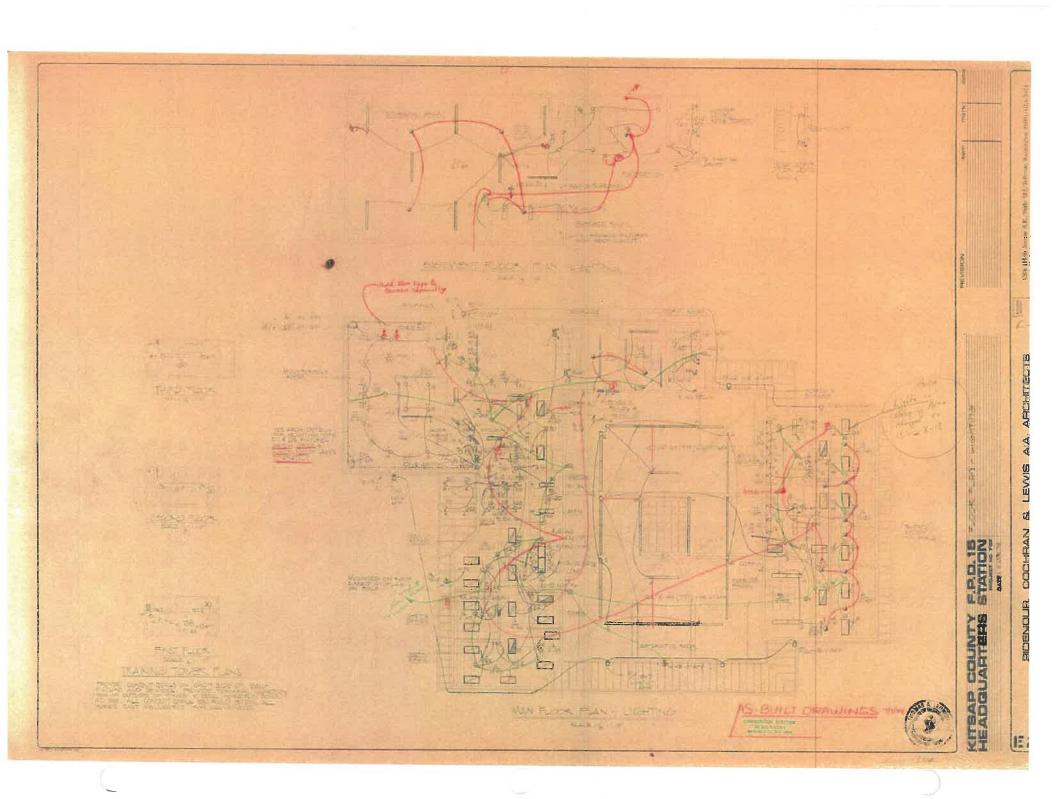
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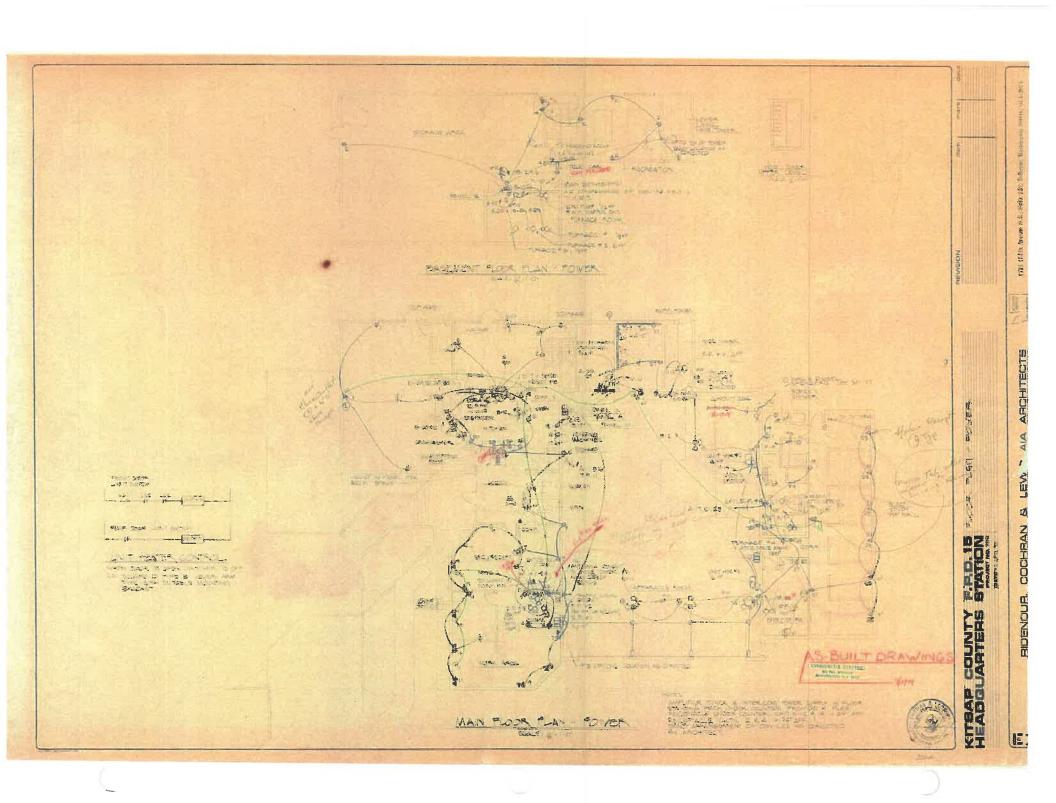


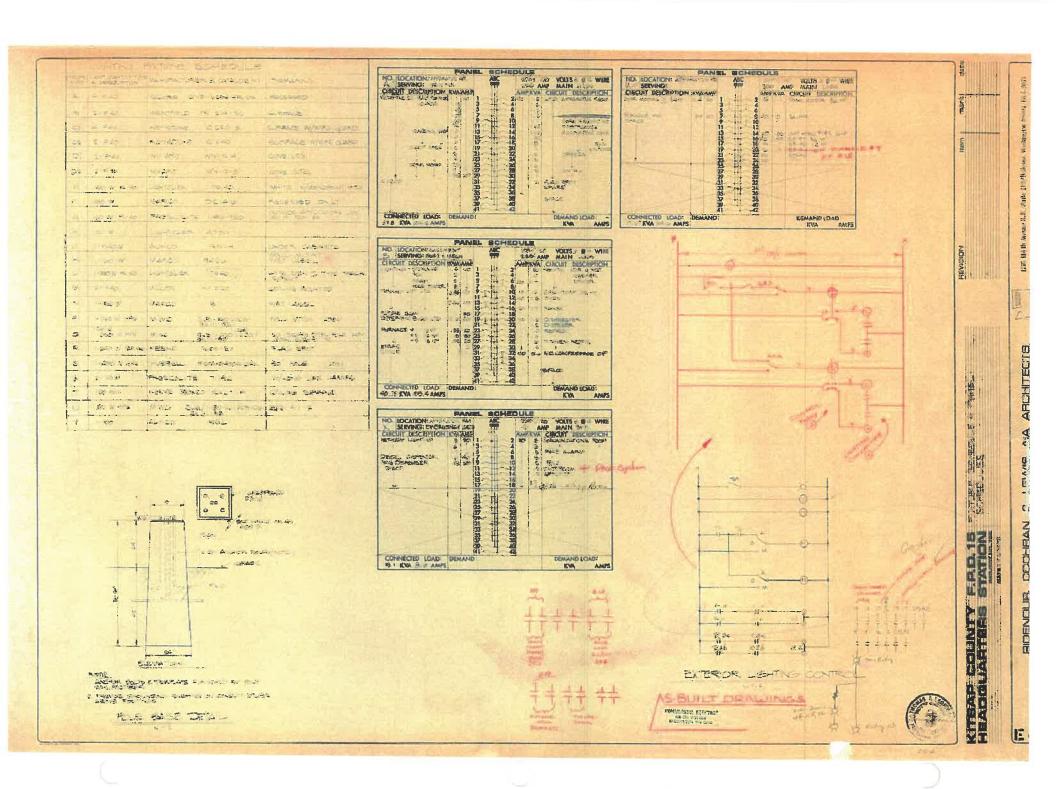


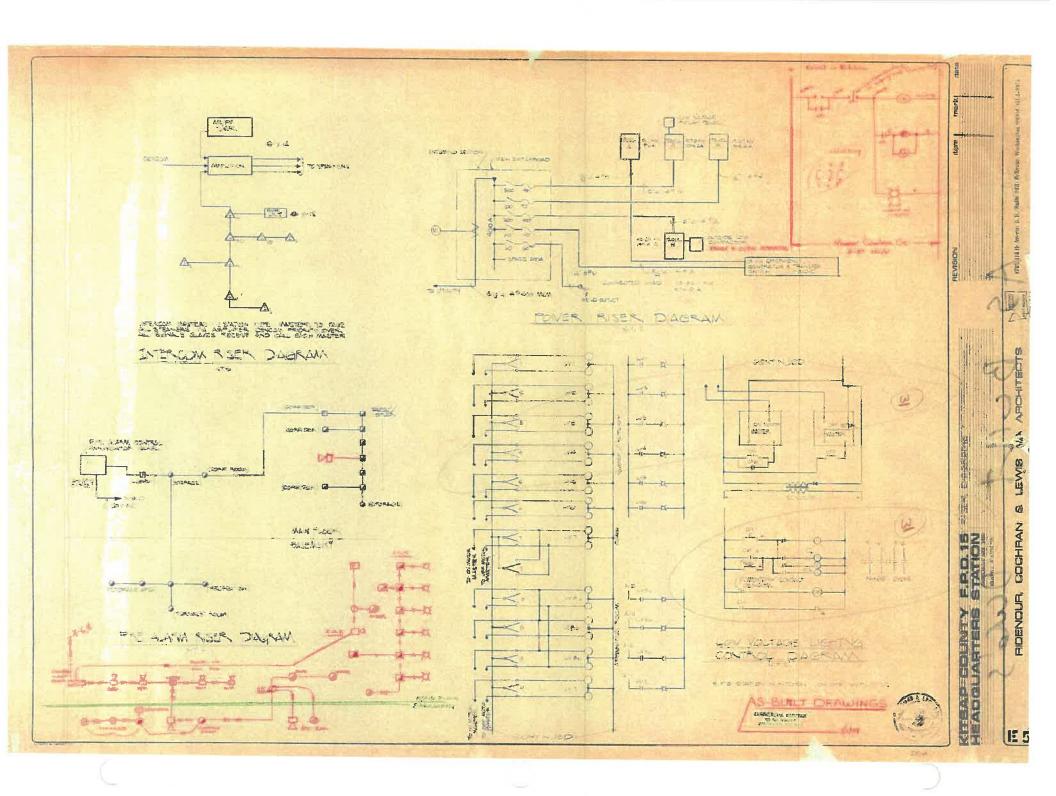














Fire Station 42 - Island Lake

Built in 1999, Fire Station 42 is 3,191 square feet in size. The station includes three single-vehicle bays, a restroom, storage, and a small mezzanine. There are no living quarters or overnight accommodations at this station.

This station was designed as the first phase of a larger fire station. At that time, the call volume in for the station could not justify more than a three-bay garage structure. With future planning in mind, 1 the station was positioned on the property so that additions could be made on the sides and rear of the structure.



Fire Station 42 – Island Lake 14061 Central Valley Road NW, Poulsbo, WA 98370

Observed Deficiencies

- Station is at risk of being unsafe to occupy after a design-level earthquake
- No decontamination facilities
- No overnight accommodations for firefighters
- No living quarters
- No Janitorial Space
- No Lobby or Public Entry
- No work area for on-duty crews
- Overall inadequacy of spaces for proper care and storage of equipment and gear
- Low level of building security at exterior doors

Proposed Improvements

Phase 1: Immediate Needs

Fire Station 42 has significant seismic deficiencies. In the event of a major earthquake, the operational readiness of the station could be substantially compromised and threaten the health and safety of the building occupants. It is recommended that, at a minimum, Fire Station 42 undergo a seismic retrofit to bring it into compliance with current codes and standards.

We have estimated the construction costs of these seismic improvements to be approximately \$81,675.00. This amount does not include project expenses, nor inflation, which would depend on the construction start date.



Phase 2: Deferred Improvements

The long-range vision for Fire Station 42 includes additions totaling 4,722 square feet. These additions on the west and north sides of the station would include bunker gear storage, a work room, a shop, decontamination facilities, and living quarters to house four firefighters that include a kitchen, dining, living, and sleeping areas, a restroom, and shower areas. With these improvements this station could accommodate 24-hour response staffing.

The overall layout of the enlarged Fire Station 42 closely follows the district's Prototype Station Plan. While not matching that plan exactly due to the dimensions of the current station, all operational functions would match the prototype plan in spirit.

Despite the observed deficiencies noted above, the fact remains that call volume in this area of the District remains relatively low. Substantial improvements made by expanding this station are of questionable value until calls for service significantly increase. Foregoing improvements to Fire Station 42 beyond seismic upgrades would not diminish the current level of service in the Island Lake area.

End of Fire Station 42 - Island Lake

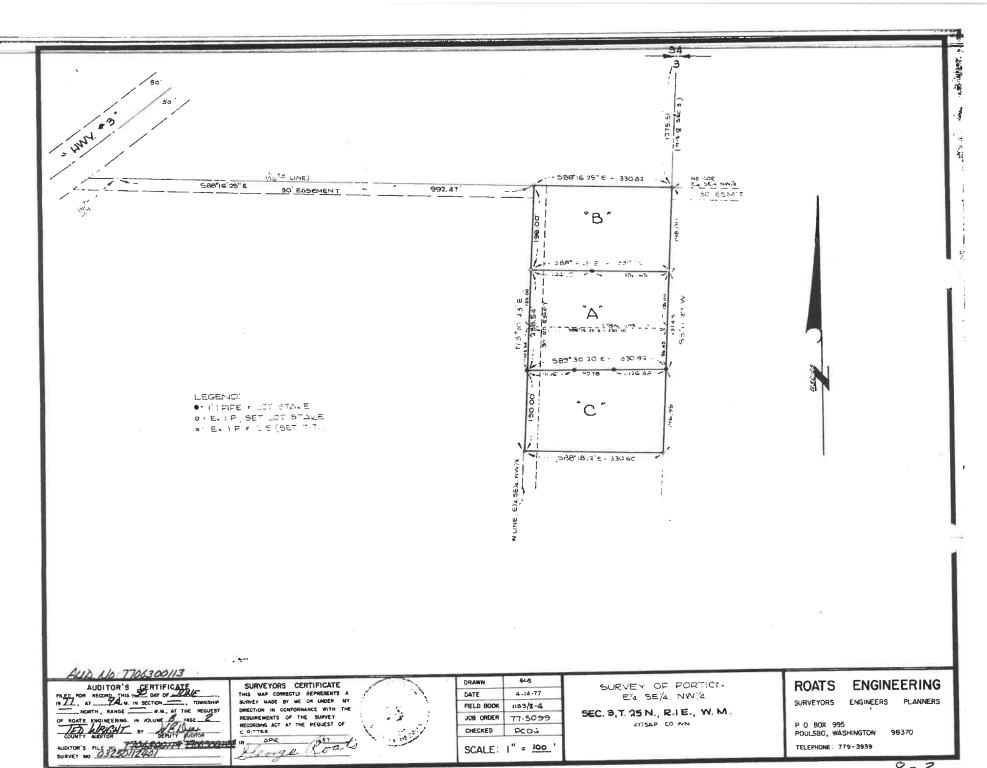


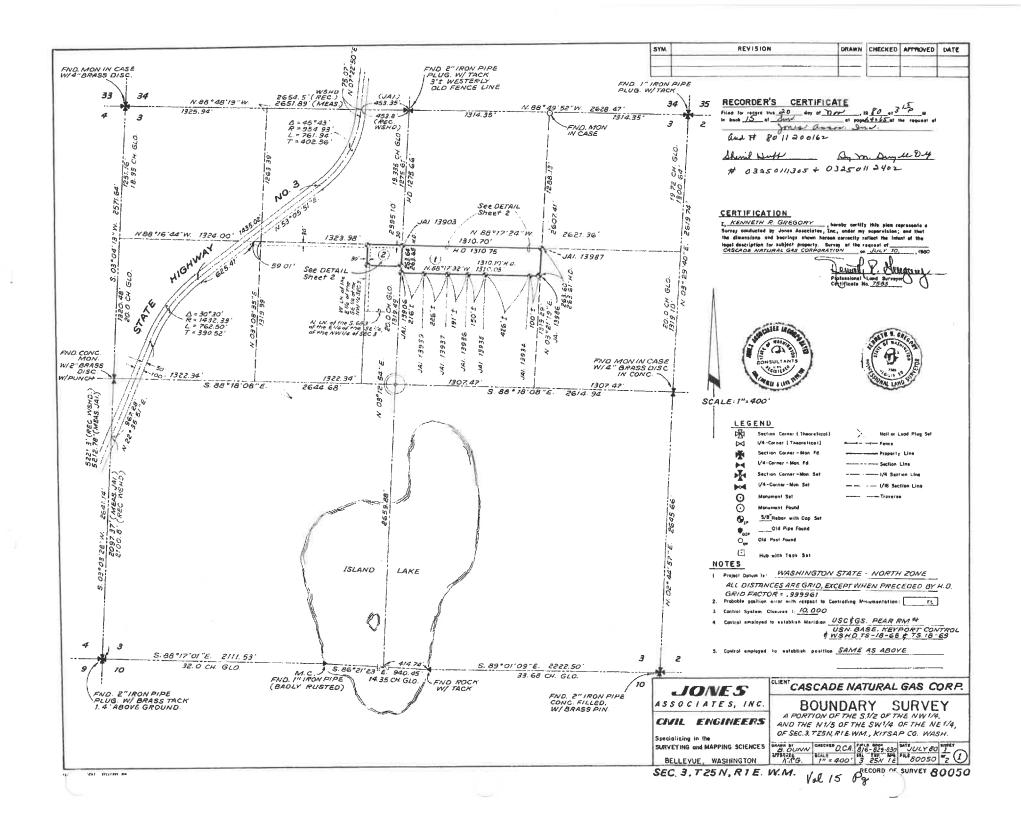
Program Requirements

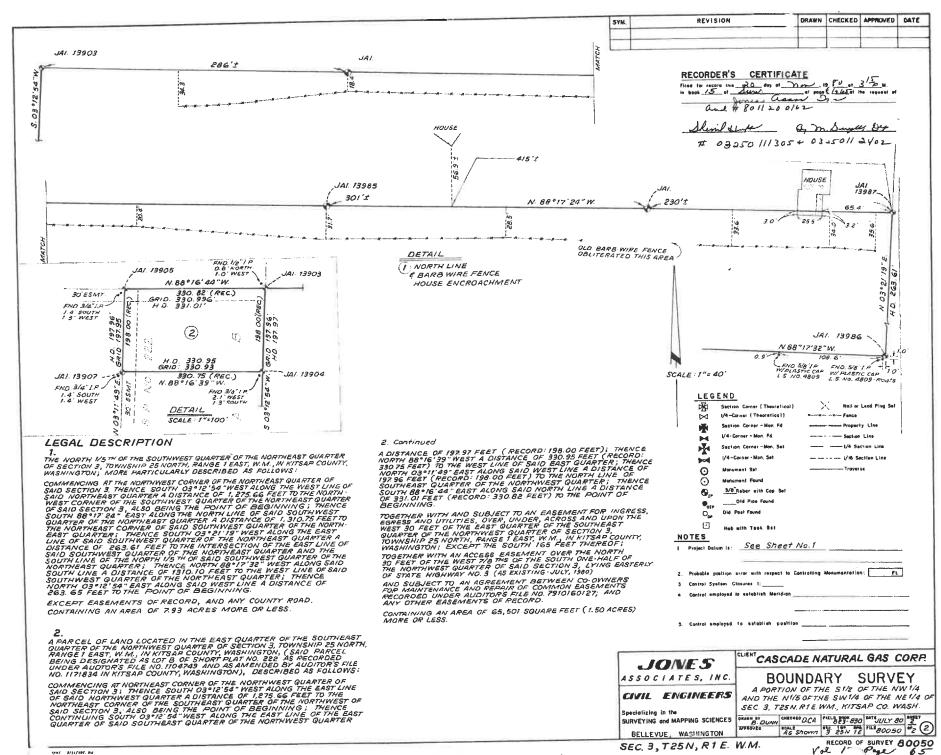
Prototype Fire Station Program Requ	irements		F:	F	F*	100
		Fire	Fire	Fire	Fire	Fire
		Station	Station	Station	Station	Station
	9	42	45	52	53	57
		lsiand Lake	North Perry	Anderson Hill	Seabeck	Coho Run
Operations			,	*		
Apparatus Bay (3-bays, back-in)	54' x 50'	2,700	2,700	2,700	2,700	2,700
Decon	10' x 11'	110	110	110	110	110
Shop	8' x 10'	80	80	80	80	80
Clean Project Room	16' x 12'6"	200	200	200	200	200
App Bay Restroom	8' x 12'	96	96	96	96	96
Bunker Gear Storage	15' x 21'	315	315	315	315	315
General Storage	8' x 10'	80	80	80	80	80
App Bay Janitorial	8' x 8'	64	64	64	64	64
Sprinkler Riser / Compressor	6° x 10°	60	60	60	60	60
Living Quarters						
(4) Sleep Rooms	(4) 9' x 15'	540	540	540	540	540
(2) Restroom/Showers	(2) 8' x 12'	192	192	192	192	192
Kitchen	14' x 20'	280	280	280	280	280
Dining for 6	16' x 14'	224	224	224	224	224
Dayroom for 4	16' x 19'	304	304	304	304	304
Fitness	24' x 20'	480	480	480	480	480
Laundry	10' x 12'	120	120	120	120	120
Janitoria)	8' x 8'	64	64	64	64	64
Public and Front of the House						
Public Lobby	8' x 12'	96	96	96	96	96
(1) Public Unisex Restroom	8' x 8'	64	64	64	64	64
Firefighter Work Area	18' x 20'	360	360	360	360	360
Station Officer Office	10' x 10'	100	100	100	100	100
Subtotal		6,529	6,529	6,529	6,529	6,529
Mechanical / Electrical	10%	653	653	653	653	653
Circulation	15%	979	979	979	979	979
Total Anticipated Square Footage		8,161	8,161	8,161	8,161	8,161

End of Program Requirements

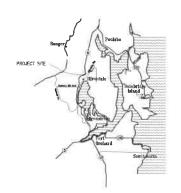




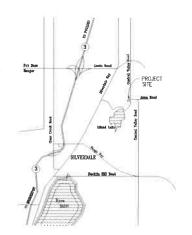




Central Kitsap Fire and Rescue Fire Station #42, Silverdale, Washington







ABBREVIATIONS Terribonard Honder Hond Quisde Diameter Quisde Face, Querfore Querfore Drain Offices Drain Ownbest, Oweborny, Quel Head Moshine Scree Quel Head Moshine Scree Querfore Quer Sewither State of the Control of the Jaufore Roll
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PROJECT INFORMATION PROJECT ADDRESS: CENTRAL KITSAP FIRE & RESCUE 1985 SURFINAL 1987 M. N. SLYDINAL 1987 M. S. SLYDINAL 1987 M. S. SLYDINAL 1987 M. S. SLYDINAL 1987 M. S. SLYDINAL 1987 M. S CENTRAL KITSAP FIRE & RESCUE
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POULSED, PREMIETEN BLEEP ARCHITECT: MECHANICAL: CIVIL: RICE FERGUS ARCHITECTS PUGET ENGINEERING STRUCTURAL: ELECTRICAL: ED JONSON & ASSOCIATES Sees Battle Point rand Emerged Bland, sessionation 98/10 Pages (580) 780-5824 Fac (584) 780-5827 TRAVIS FITZMAURICE & ASSOCIATES 222 C BURN, SIFE 700 SEATILE, WISHINGTON SHOOL PROBE (1996) 225-7228 FAX (MS) 245-7254 DRAWING INDEX C-1 ROAD GRADING & GRANAGE PUM C-2 SEDROIS, DETALS, & NOTES C-3 PROFILES & DETALS C-4 TESC, PUM C-5 TESCP, PUM & DETALS A1.3 SITE PLAN & DETRES EI SITE PLAN & LIGHTING PLAN EZ POWER & SYSTEMS PLANS CODES PROJECT DESCRIPTION ALLOWABLE FLOOR AREA ACTUAL MUMBER OF STORES

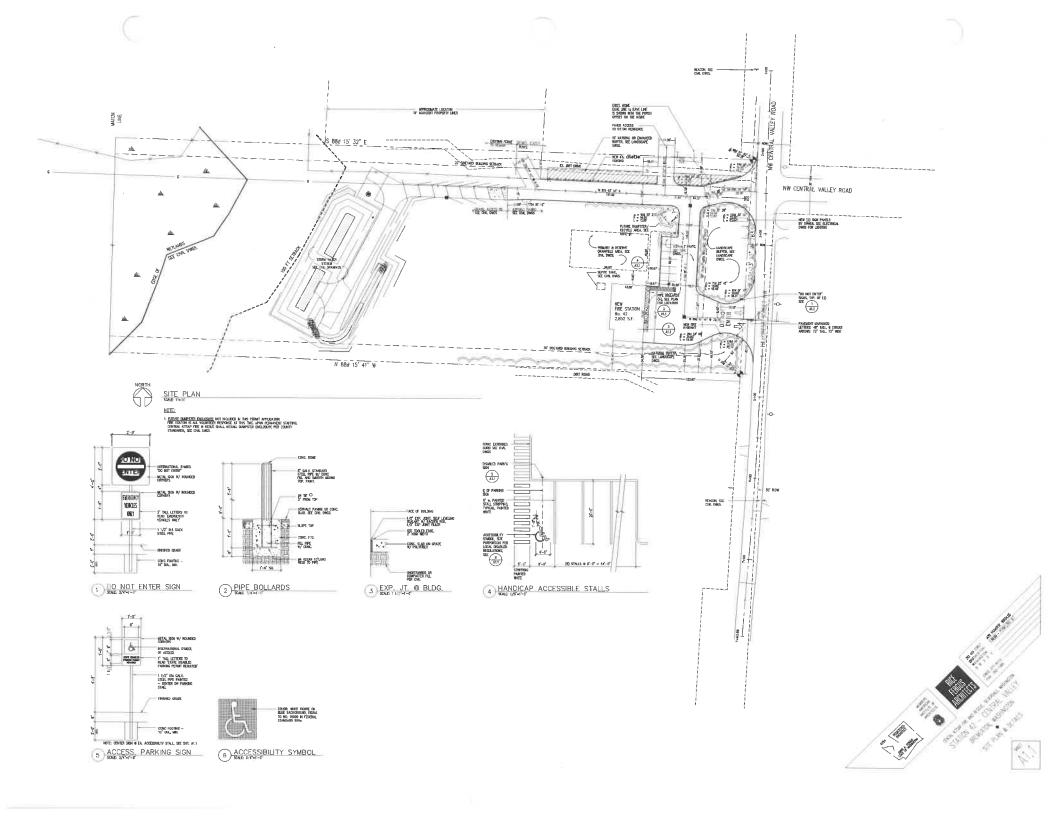
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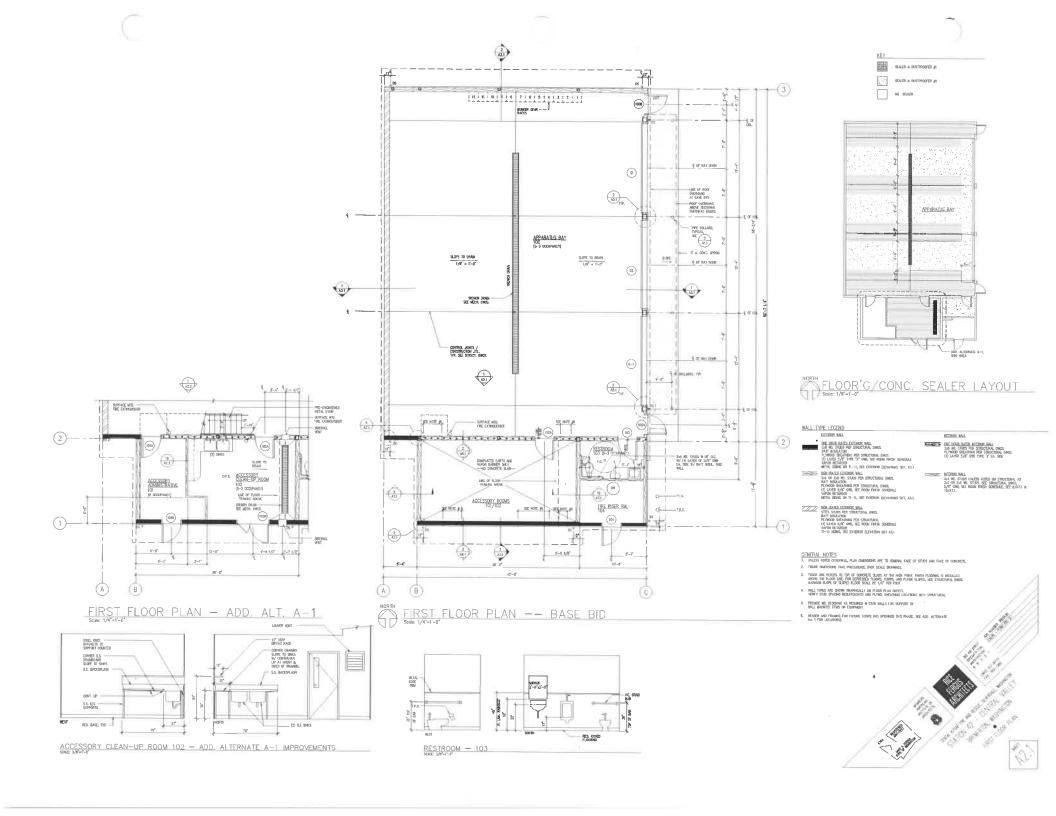
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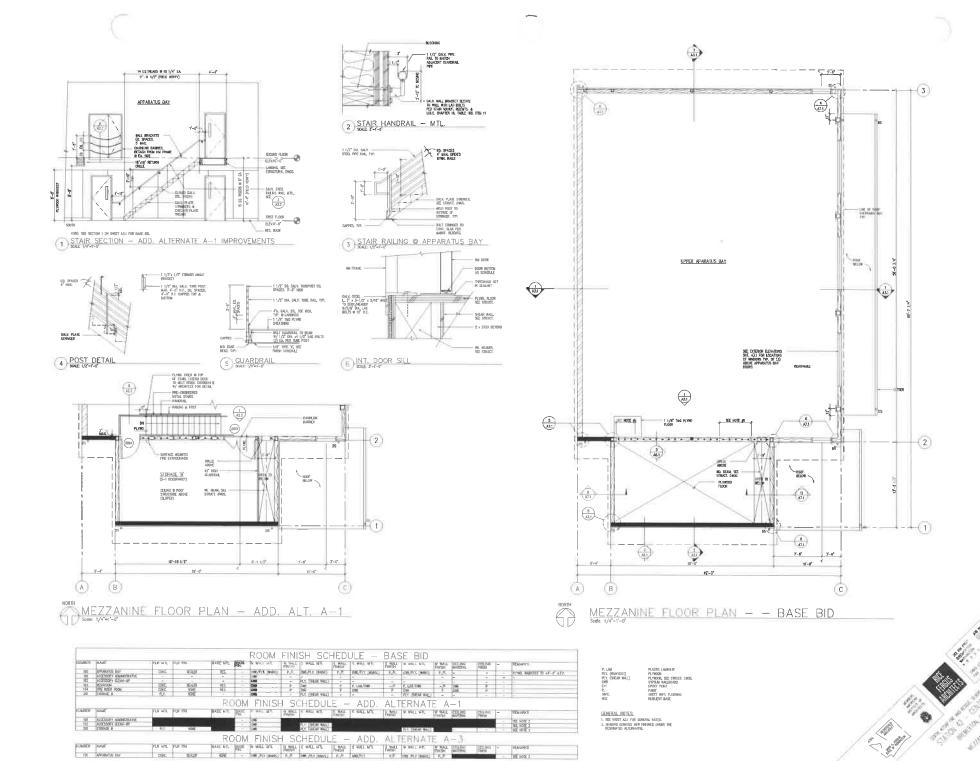
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Symbols

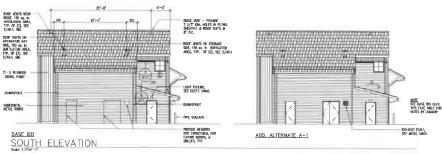
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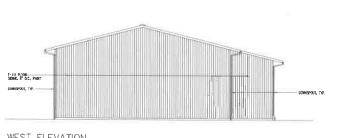




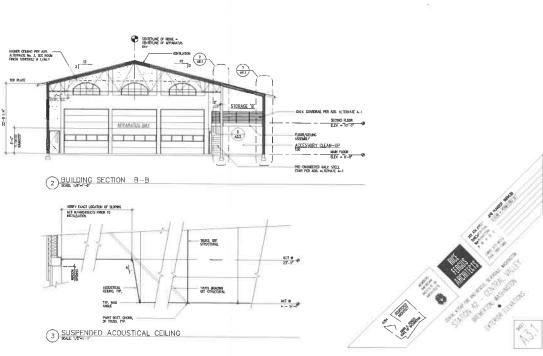


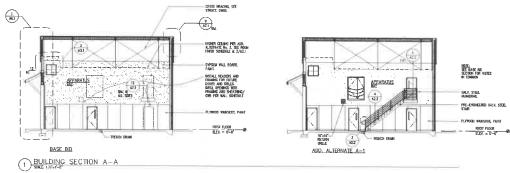


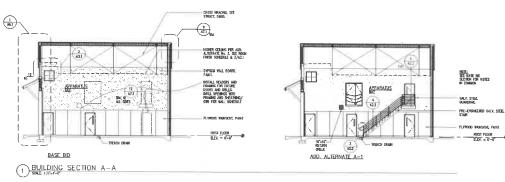
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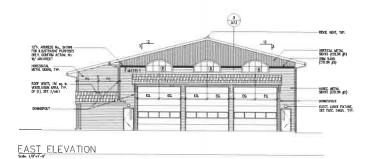


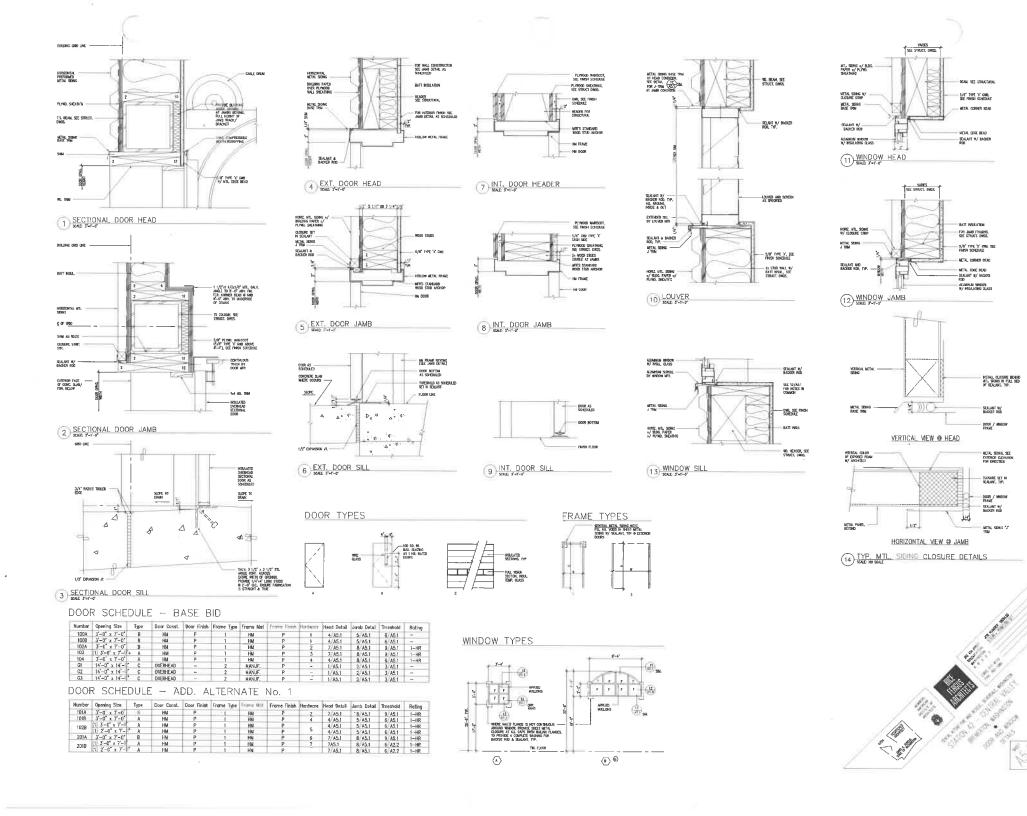
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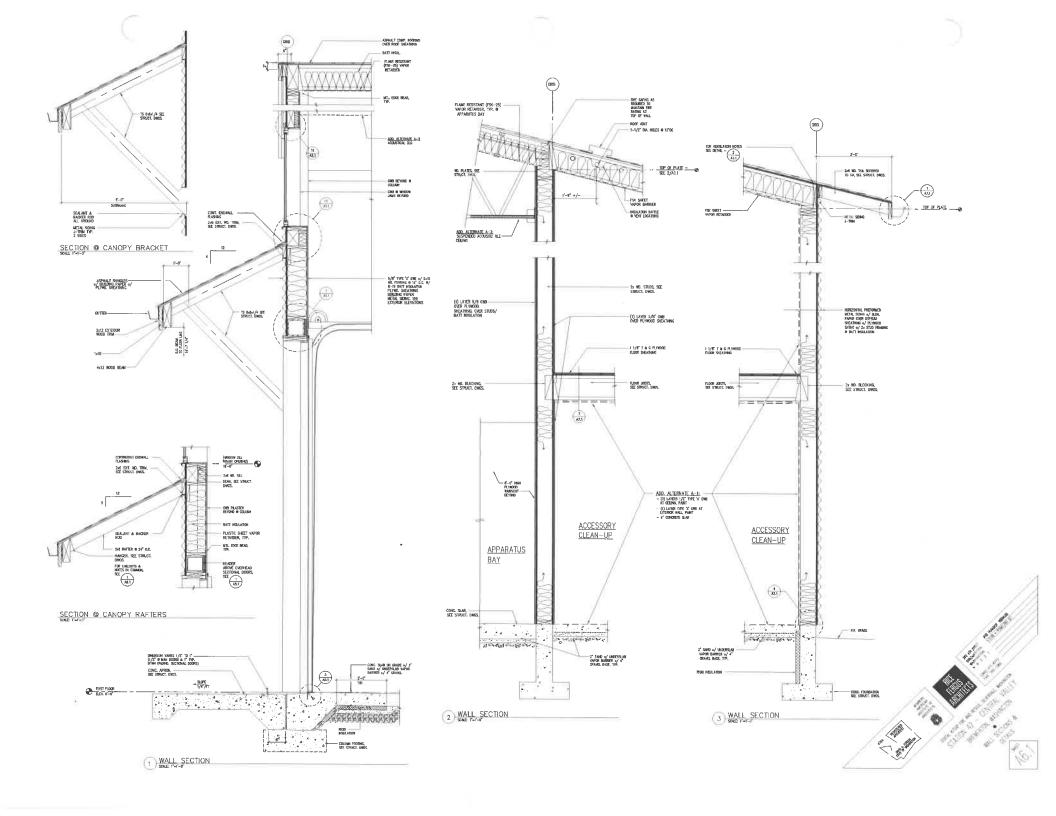


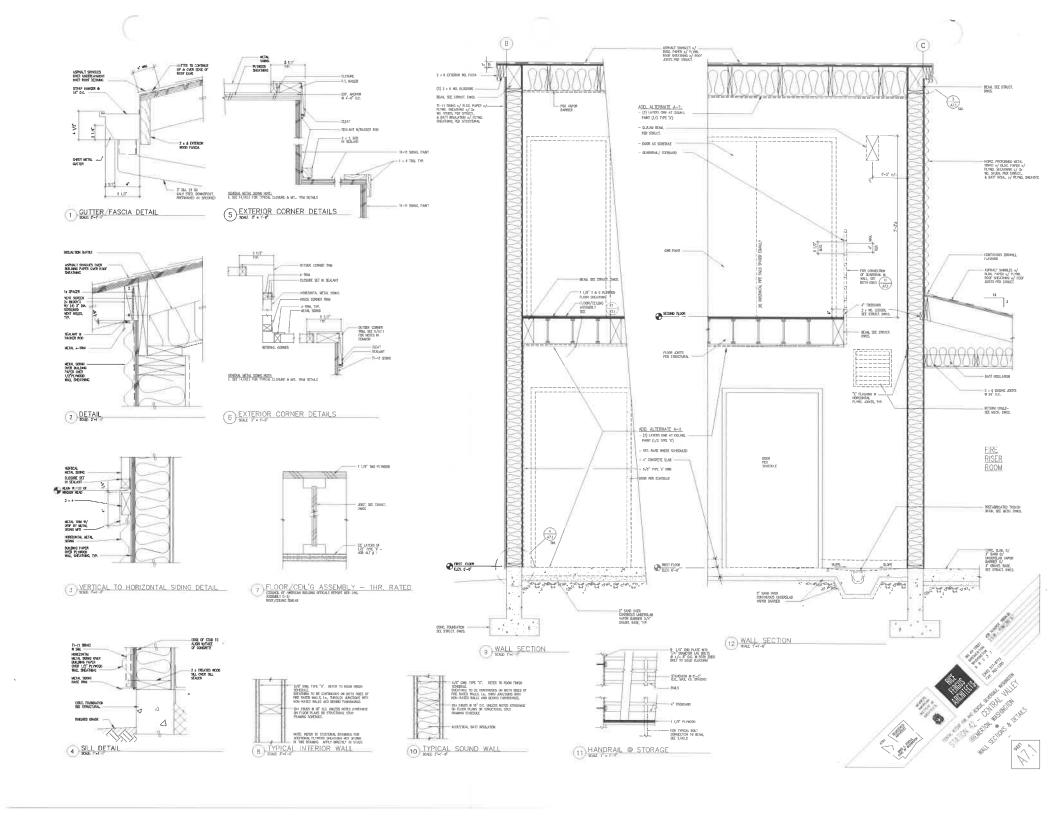


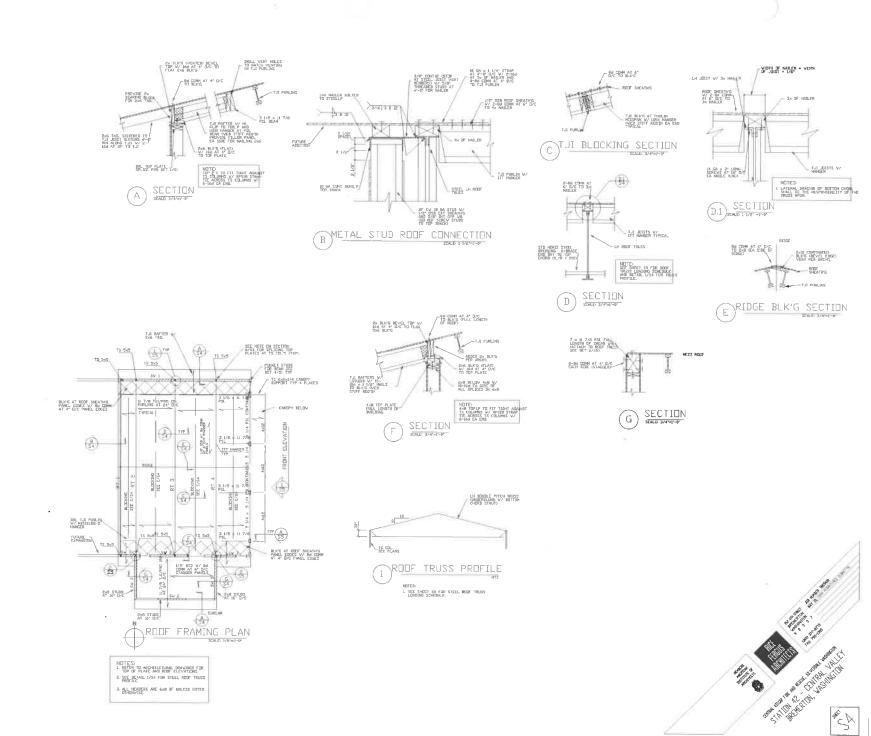












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 DOUBLE DUPLEX RECEPTACLE,54" AFF DUPLEX RECEPTACLE ABOVE COUNTER GFI () GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE.
18" AFF VF (C) GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE, WEATHERPROOF, 18" AFF,U.N.O.

© CORD REGU RECEPTAGLE FOR "SHORE POWER" CORD REEL F
 JUNCTION BOX ## POWER OUTLET

MOTOR OUTLET

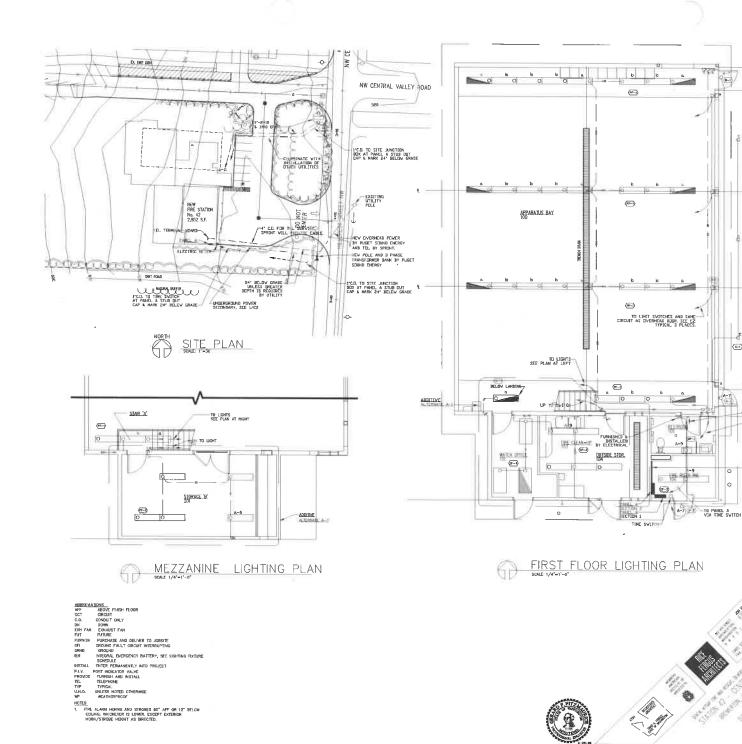
MOTOR PISCONNECT SWITCH MAGNETIC MOTOR STARTER PUSHBUTTON SWITCH STATION WALL HEATER

THERMOSTAT

FIRE ALARM PULL STATION, 48" AFF

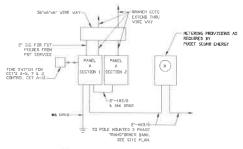
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TELEPHONE OUTLET, 18*AFF, U.N.O.
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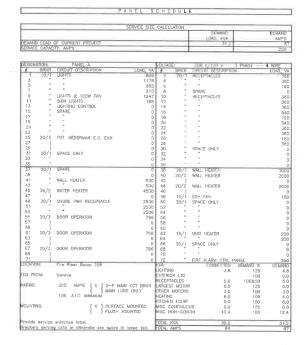


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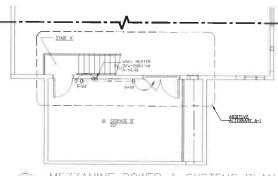


POWER DISTRIBUTION DIAGRAM
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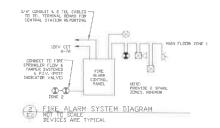


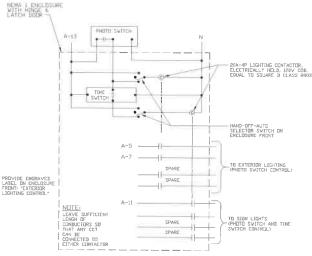


3 DEEDE CONTROL STATION DETAIL

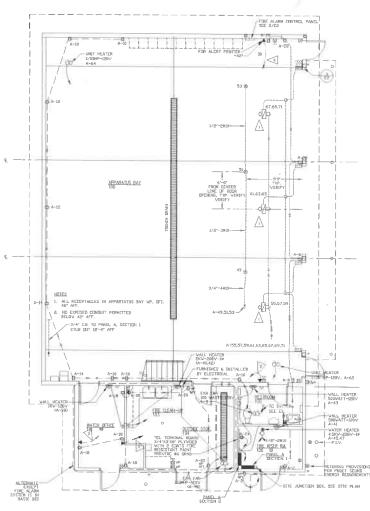


MEZZANINE POWER & SYSTEMS PLAN





EXTERIOR LIGHTING CONTROL DIAGRAM

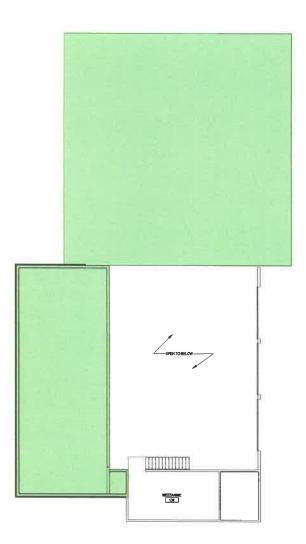








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275 FIFTH STREET, SLITTE 100
BREMERTON, WA 98337
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RFMARCH.COM





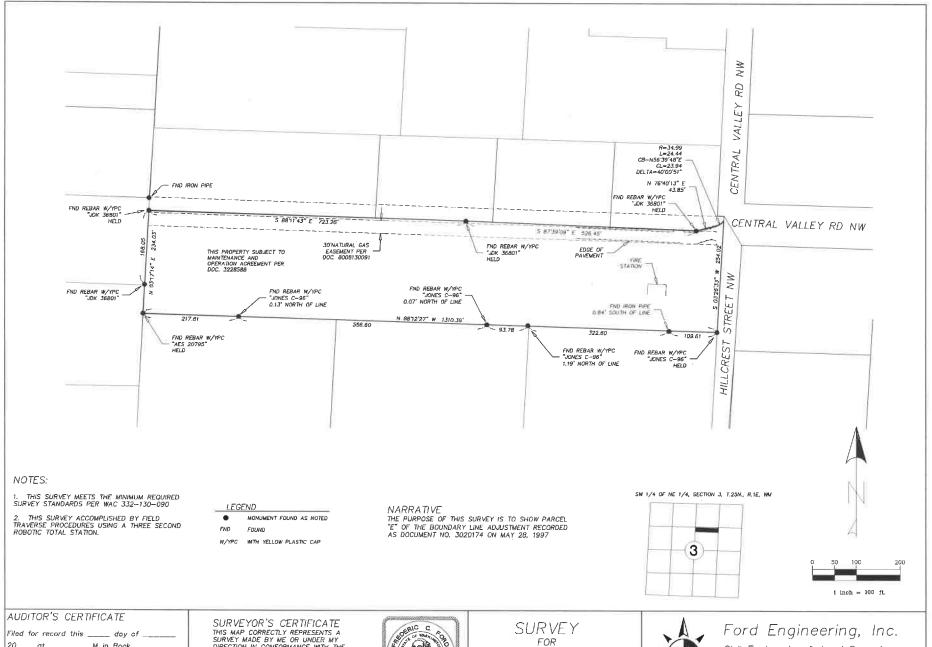
NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE STATION 42 H4081 CENTRAL VALLEY ROAD NW. POLLUSBO WA, 98370



FLOOR PLAN

A21.11



20___ at _____ at the request of
Frederic C. Ford

Deputy County Auditor

SURVEYOR'S CERTIFICATE
THIS MAP CORRECTLY REPRESENTS A
SURVEY MADE BY ME OF UNDER MY
DIRECTION IN CONFORMANCE WITH THE
REQUIREMENTS OF THE SURVEY RECORDING
ACT AT THE REQUEST OF CENTRALL
KITSAP FIRE & RESCUE IN APRIL, 2017.

FREDERIC C. FORD, PLS NO. 40194



SURVEY
FOR
CK FIRE & RESCUE.
IN THE SW 1/4 OF THE NE 1/4
SEC. 3, T.25N., R.1E., W.M.
KITSAP COUNTY, WASHINGTON



Civil Engineering & Land Surveying

12205 laka Way NW Silverdale, Washington 98383 Phone (360) 588-2124 Fox (503) 296-2374

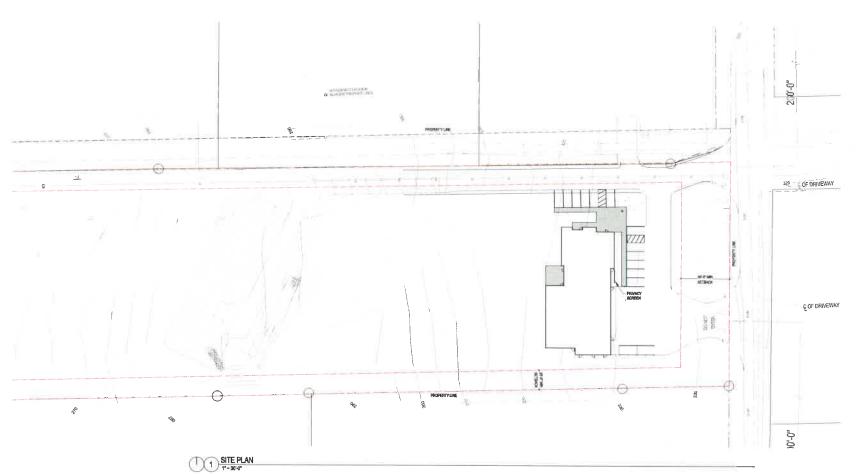
DATE: 4/16/2018

www.fordeng.com

fcf@fordeng.com

KEY NOTES - SITE PLAN GENERAL NOTES - SITE PLAN

AICH SET WILLIAM PLACORS VIELA 275 FIFTH STREET, SUITE 100 BREMERTON, WA 88337 360-377-373 RFMARCH.COM



NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE STATION 42 14061 Central Valley Road NW, Poulsbo, WA 98370

PROJECT# 2017090.00 PROJECT STATUS MAY 16, 2018 ISSUE DATE

ARCHITECTURAL SITE PLAN

A10.01



Central Kitsap Fire and Rescue Bond Study 10/2/2019

Station 42-Island Lake
Station 42 Seismic Work

\$ 81,675

Total direct Today's Dollars \$

81,675

Exclusions:

Escalation

State Sales Tax

Construction Contingency

Architect/Engineering Fees

Permits

Toxic Soils/Materials Removal

Construction Management Fees

Utility Infrastructure to Site

Piling/Special Foundations

Wetland Mitigation

Jurisdictional/Utility Co. Fees

Owner's Consultant Costs

Equipment & Furnishings Not Listed

Off Site Work

Builders Risk Insurance

Moving/Relocation Expense

Alternative Delivery-GC/CM, Design-Build

Legal Expense

Land Purchase/Financing Costs

Fire Vehicles/Apparatus/Radio Towers

Project/Bid Market/Code Change Contingency

Site Work

Building Additions

Building Remodel



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Station 42 Seismic Summary

Area Station 42: 3,191 SF Rates Current At September 2019

Description		Cost/SF	Total Cost
A10 Foundations		\$1.47	\$4,675
B10 Superstructure		\$19.79	\$63,162
	ESTIMATED NET COST	\$21.26	\$67,837
MARGINS & ADJUSTMENTS			
Design Contingency-Remodel	12.0 %		\$8,140
Contractors Overhead & Profit	7.5 %		\$5,698
	ESTIMATED TOTAL COST	\$25.60	\$81,675



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Station 42 Seismic Detail

Area Station 42: 3,191 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost	
A1010	Standard Foundations					
364	Holddowns added		EA	11	425.00	4,675
		Standard Foundations			\$1.47/SF	\$4,675
B1020	Roof Construction					
394	Demo, shore and construct new shear wall		SF	1,416	31.47	44,562
395	Strengthen drag strut connection		EA	2	1,500.00	3,000
396	Upgrade shear wall		SF	975	16.00	15,600
		Roof Construction			\$19.79/SF	\$63,162
		ESTIMATED NET COST			\$21.26/SF	\$67,837

			•		
			•		
	76				
		56.			
					23

CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for:

Rice Fergus Miller Architecture



Prepared by:

Corbin M. Hammer, P.E., S.E. Principal Engineer

Katherine R. Brawner, P.E. Project Engineer

Reid Middleton

728 134th Street SW, Suite 200 Everett, WA 98204 425-741-3800 File No. 262019.052

1.0 Executive Summary

Seismic screenings and structural evaluations were performed for eight Central Kitsap Fire and Rescue fire facility buildings to investigate seismic deficiencies. All buildings evaluated in this study are low-rise structures and include seven fire stations and one support facility. Each building is considered critical to the City's ability to provide post-earthquake emergency services.

The evaluations determined each building's expected structural performance for an Immediate Occupancy performance objective. After a seismic event, buildings that meet an Immediate Occupancy performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. This report includes a description of each building, the identified seismic deficiencies, seismic-upgrade concept designs for four of the active stations, and recommendations. All the buildings were found to have seismic deficiencies and do not meet the Immediate Occupancy performance objective.

Concept-level seismic upgrade designs were completed for four of the stations and concept plans are provided describing options for mitigation of seismic deficiencies. Recommendations consist of strengthening and supplementing the existing lateral systems, improving lateral load paths, and improving connections. Additional factors such as operational use, functionality, response times, and historic value should also be considered in the decision-making process for these buildings.

3.0 Seismic Evaluation

3.1 Fire Station 42

3.1.1 Building Description

Year Built:

1999

Number of Stories:

2 (partial second

floor)

Floor Area:

3,167 SF

Address:

14061 Central

Valley Road NW,

Poulsbo, WA



Fire Station 42, known as the Island Lake Community Fire Station, is a wood-framed structure with a partial second floor adjacent to the apparatus bay and was built in 1999. The building is approximately 70 feet by 42 feet in plan and 29 feet tall at its peak, with the one-story apparatus bay roof elevation and slope matching the height of the two-story section. Building construction consists of light wood framing. Building construction consists of steel trusses over the apparatus bay and wood-framed roof elsewhere with oriented strand board (OSB). The diaphragms are supported by wood-framed shear walls. Fire Station 42 is a volunteer station that houses two engines and one aid vehicle.



Figure 3.1-1. Fire Station 42, North Exterior.



Figure 3.1-2. Fire Station 4, Apparatus Bay Interior.

Structural System

Table 3.1-1. Structural System Description of Fire Station 42.

Structural System	Description
Roof	The roof system over the apparatus bay is composed of steel roof trusses with I-joist purlins supporting oriented strand board (OSB). The roof framing over the two-story building portion is composed of I-joist wood framing supporting OSB.
Floor	The floor is slab on grade, and the partial second floor is wood framed with I-joists.
Foundations	The wood-framed walls are supported by continuous concrete spread footings.
Hose Tower	N/A.
Lateral System	Wood shear walls provide lateral resistance in both the longitudinal and transverse directions. At the apparatus bay, load is dragged parallel to the doors into the wood shear walls at the two-story building portion.

3.1.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.1-2. Identified Seismic Deficiencies for Fire Station 42.

Deficiency	Description
Shear Stress Check	The shear stress in the wood shear walls exceeds 1,000 pounds per linear foot. The walls may not have adequate strength to resist seismic forces.
Narrow Wood Shear Walls	The aspect ratios of some walls that are being utilized as shear walls exceed 1.5-to-1. Walls with large aspect ratios are likely to be highly stressed and subject to severe deformations that reduce capacity.

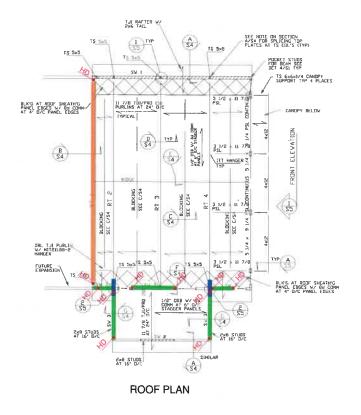
There was no geotechnical report provided for the site in question, causing checklist items involving soil to be marked as "unknown". It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be completed for verification.

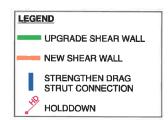
3.1.3 Findings and Recommendations

Fire Station 42 does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. The wood shear walls are overstressed, creating the potential for damage and possible failure of the lateral-force-resisting system (LFRS) during a design-level earthquake. It is recommended that the building undergo a more-detailed evaluation and be retrofitted based on the findings of that evaluation. Based on the identified deficiencies and the age of the structure, a more-detailed seismic evaluation of the structure may show that the building complies with the performance objective.

Irrespective of a more-detailed evaluation, Figures 3.1-3 displays the schematic-level upgrade concept to improve the LFRS of Fire Station 42 to meet the IO performance objective.

The upgrade approach involves adding shear strength to the building by upgrading existing wood shear walls and increasing the strength of the connections between the roof trusses at the apparatus bay dragging load to the wood shear walls. Modifications to the foundation systems may be required for the existing upgraded walls.





17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
		х		MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System – Building Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
X				SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	±-
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
X				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
X				MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			Х	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
			X	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			X	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-7. Immediate Occupancy Checklist for Building Type W2

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
	x			SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing, 1,000 lb/ft (14.6 kN/m); Diagonal sheathing, 700 lb/ft (10.2 kN/m); Straight sheathing, 100 lb/ft (1.5 kN/m); All other conditions, 100 lb/ft (1.5 kN/m). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec.A.3.2.7.1)	
X				STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multistory buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.2)	
X				GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.3)	
X				NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	,
X				WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Tier 2: Sec. 5.5.3.6.2; Commentary: Sec. A.3.2.7.5)	Record drawings are not available and was not observed on site but check is anticipated to be compliant.
		х		HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Tier 2: Sec. 5.5.3.6.3; Commentary: Sec. A.3.2.7.6)	
		Х		CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Tier 2: Sec. 5.5.3.6.4; Commentary: Sec. A.3.2.7.7)	
X				OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Tier 2: Sec. 5.5.3.6.5; Commentary: Sec. A.3.2.7.8)	Apparatus bay door wall supported by steel posts and roof framing.
X				HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices. (Tier 2: Sec. 5.5.3.6.6; Commentary: Sec. A.3.2.7.9)	Record drawings are not available and was not observed on site but check is anticipated to be compliant.

17-7. Immediate Occupancy Checklist for Building Type W2

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD POSTS: There is a positive connection of wood posts to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.3)	Record drawings are not available and was not observed on site but check is anticipated to be compliant.
X	,			WOOD SILLS: All wood sills are bolted to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.4)	Record drawings are not available and was not observed on site but check is anticipated to be compliant.
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	Record drawings are not available and was not observed on site but check is anticipated to be compliant.

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
		Х		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: 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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	X			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	2-to-1 aspect ratio walls are utilized.

Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.1)	
х				ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.3)	
		Х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	

17-7. Immediate Occupancy Checklist for Building Type W2

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	
X				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
		Х		DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.1 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	Diaphragm is blocked.
X				OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				acceptable edge and end distance provided for wood and	Record drawings are not available and was not observed on site but check is anticipated to be compliant.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.



Thank you for your transaction!

We have generated an electronic copy of your file for you. Within you will find both the preliminary title commitment and historical documents on your transaction; they are designed such that you can navigate between the commitment and related documentation with greater ease.

The navigation bar along the left can be used to go directly to bookmarked pages in the file. If you have questions or desire further information or clarification on your file, contact the title unit by clicking one of the links below.

Title Department Contacts:

Title Department Phone: (360) 307-6308 / Fax: (360) 307-6384

Andy Buskirk - Title Officer <u>ABuskirk@pnwtkitsap.com</u>
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Marian Scott - Senior Title Officer <u>MarianS@pnwtkitsap.com</u>
Lori Bullard - Senior Title Officer, Title Manager <u>LoriB@pnwtkitsap.com</u>

Julie Goodman - Chief Title Officer JGoodman@pnwtkitsap.com

Shelley Hill - Recording/Title Technician ShelleyH@pnwtkitsap.com

We appreciate this opportunity to be of service to you!

E-Mail: Trade ()mailto:Statemailto:Statemailto:State

2021 NW Myhre Road, Suite 300, PO Box 3607, Silverdale, WA 98383



Title Insurance Escrow Service Real Estate Resources

Our Privacy Policy

We may collect nonpublic personal information about you from the following sources:

- Information we receive from you such as on applications or other forms.
- Information about your transactions we secure from our files, or from others.
- Information we receive from a consumer reporting agency.
- Information that we receive from others involved in your transaction, such as the real estate agent or lender.

Unless it is specifically stated otherwise in an amended Privacy Policy Notice, no additional nonpublic personal information will be collected about you.

WE DO NOT DISCLOSE ANY NONPUBLIC PERSONAL INFORMATION ABOUT YOU WITH ANYONE FOR ANY PURPOSE.

We restrict access to nonpublic personal information about you to those employees who need to know that information in order to provide products or services to you. We maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

Thank you for choosing Pacific Northwest Title. We value you as a customer and appreciate the opportunity to serve you.

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE LIMITS OF LIABILITY AND THE CONDITIONS AND STIPULATIONS OF THIS GUARANTEE,



GUARANTEES

the Assured named in Schedule A against actual monetary loss or damage not exceeding the liability stated in Schedule A, which the Assured shall sustain by reason of any incorrectness in the assurances set forth in Schedule A.

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

A Corporation

A Corporation 400 Second Avenue South, Minneapolis, Minnesota 55401 (612) 371-1111

Issued through the office of:
Pacific Northwest Title Company of Kitsap County, Inc.
2021 Myhre Road NW, Suite.300
Post Office Box 3607
Silverdale, WA 98383

Authorized Signature

Ву

Attest

President

Secretary

Subdivision Guarantee

Subdivision Guarantee

Order No.:

32164965

Guarantee No.:

SGW 08002453

Liability: \$ 2,000.00

Fee: \$ 300.00 Tax: \$ 27.00

Effective Date: April 20, 2018 at 8:00 a.m.

Reference: 032501-1-020-2007

Name of Assured:

Ford Engineering

The assurances referred to on the face page are as shown below.

Title to the real property described herein is vested in:

Kitsap County Fire Protection District No. 15, a Washington Municipal Corporation

The land is situate in the County of Kitsap State of Washington, and is described as follows:

Parcel I:

Resultant Parcel E of Boundary Line Adjustment recorded under Auditor's File No. 3020714, being a portion of the Southwest quarter of the Northeast quarter of Section 3, Township 25, Range 1 East, W.M., in Kitsap County, Washington.

Parcel II:

An easement for access over the North 30 feet of the West 7/8ths of the South one-half of the Northwest quarter, Section 3, Township 25 North, Range 1 East, W.M., in Kitsap County, Washington, lying Easterly of State Highway No. 3.

The abbreviated legal description is provided to enable the document preparer to conform with the requirements of RCW 65.04.045:

Resultant Parcel E of BLA, AFN 3020174, Ptn SW/NE, Section 3, Township 25 North, Range 1 East

There are no easements, leases, options to purchase, mortgages, or deeds of trust which purport to affect said land, other than those shown as follows:

Easement for electric transmission and distribution line, and the terms and conditions thereof, together with necessary appurtenances, as granted by instrument recorded on May 20, 1941, under Kitsap County Auditor's File No. 336424.

To: Puget Sound Power and Light Company

Note: The description contained therein is insufficient to specifically locate said easement.

Order No.: 32164965

2. Right Of Way Contract for the right to select the route for and construct, maintain, inspect, operate, protect, repair, replace, alter and remove a pipeline or pipelines for the transportation of oil, gas and the products thereof, and the terms and conditions thereof, affecting a portion of said premises and for the purposes hereinafter stated, as disclosed by instrument recorded on August 13, 1980, under Kitsap County Auditor's File No. 8008130091.

In favor of:

Cascade Natural Gas Corporation

Affects:

A portion of said premises

3. Boundary Line Adjustment and the terms and conditions thereof:

Recorded:

May 28, 1997

Auditor's File No.:

3020174

4. Declaration of Covenant Associated with Maintenance and Operation of Storm Drainage Facilities and the terms and conditions thereof:

Recorded:

December 28, 1999

Auditor's File No.:

3228588

5. Matters delineated, described and noted on Survey recorded June 30, 1977, in Volume 8, Page 2, under Auditor's File No. 7706300113.

 Matters delineated, described and noted on Survey recorded November 20, 1980, in Volume 15, Pages 64-65, under Auditor's File No. 8011200162.

ote 1:

General and Special Taxes and Charges for the year 2018 have been paid in full:

In the Amount of:

\$1,058.48

Tax Account Number:

032501-1-020-2007

Levy Code:

4290

Assessed Value:

\$0.00

Note: It appears the above amounts are for Noxious Weed and Stormwater Management Assessments only.

SCHEDULE OF EXCLUSIONS FROM COVERAGE OF THIS GUARANTEE

- Except to the extent that specific assurances are provided in Schedule A of this Guarantee, the Company assumes no liability for loss or damage by reason of the following:
 - (a) Defects, liens, encumbrances, adverse claims or other matters against the title, whether or not shown by the public records.
 - (b) (1) Taxes or assessments of any taxing authority that levies taxes or assessments on real property; or, (2) Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not the matters excluded under (1) or (2) are shown by the records of the taxing authority or by the public records.
 - (c) (1) Unpatented mining claims; (2) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (3) water rights, claims or title to water, whether or not the matters excluded under (1), (2) or (3) are shown by the public records.
- 2. Notwithstanding any specific assurances which are provided in Schedule A of this Guarantee, the Company assumes no liability for loss or damage by reason of the following:
 - (a) Defects, liens, encumbrances, adverse claims or other matters affecting the title to any property beyond the lines of the land expressly described in the description set forth in Schedule (A), (C) or in Part 2 of this Guarantee, or title to streets, roads, avenues, lanes, ways or waterways to which such land abuts, or the right to maintain therein vaults, tunnels, ramps or any structure or improvements; or any rights or easements therein, unless such property, rights or easements are expressly and specifically set forth in said description.
 - (b) Defects, liens, encumbrances, adverse claims or other matters, whether or not shown by the public records; (1) which are created, suffered, assumed or agreed to by one or more of the Assureds; (2) which result in no loss to the Assured; or (3) which do not result in the invalidity or potential invalidity of any judicial or non-judicial proceeding which is within the scope and purpose of the assurances provided.
 - (c) The identity of any party shown or referred to in Schedule A.
 - (d) The validity, legal effect or priority of any matter shown or referred to in this Guarantee.

GUARANTEE CONDITIONS AND STIPULATIONS

1. DEFINITION OF TERMS

The following terms when used in the Guarantee mean:

- (a) the "Assured": the party or parties named as the Assured in this Guarantee, or on a supplemental writing executed by the Company.
- (b) "land": the land described or referred to in Schedule (A) or in Part 2, and improvements affixed thereto which by law constitute real property. The term "land" does not include any property beyond the lines of the area described or referred to in Schedule (A) or in Part 2, nor any right, title, interest, estate or easement in abutting streets, roads, avenues, alleys, lanes, ways or waterways.
- (c) "mortgage": mortgage, deed of trust, trust deed, or other security instrument.
- (d) "public records": records established under state statutes at Date of Guarantee for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without knowledge.
- (e) "date": the effective date.

2. NOTICE OF CLAIM TO BE GIVEN BY ASSURED CLAIMANT

An Assured shall notify the Company promptly in writing in case knowledge shall come to an Assured hereunder of any claim of title or interest which is adverse to the title to the estate or interest, as stated herein, and which might cause loss or damage for which the Company may be liable by virtue of this Guarantee. If prompt notice shall not be given to the Company, then all liability of the Company shall terminate with regard to the matter or matters for which prompt notice is required; provided, however, that failure to notify the Company shall in no case prejudice the rights of any Assured under this Guarantee unless the Company shall be prejudiced by the failure and then only to the extent of the prejudice.

3. NO DUTY TO DEFEND OR PROSECUTE

The Company shall have no duty to defend or prosecute any action or proceeding to which the Assured is a party, notwithstanding the nature of any allegation in such action or proceeding.

4. COMPANY'S OPTION TO DEFEND OR PROSECUTE ACTIONS; DUTY OF ASSURED CLAIMANT TO COOPERATE

Even though the Company has no duty to defend or prosecute as set forth in Paragraph 3 above:

- (a) The Company shall have the right, at its sole option and cost, to institute and prosecute any action or proceeding, interpose a defense, as limited in (b), or to do any other act which in its opinion may be necessary or desirable to establish the title to the estate or interest as stated herein, or to establish the lien rights of the Assured, or to prevent or reduce loss or damage to the Assured. The Company may take any appropriate action under the terms of this Guarantee, whether or not it shall be liable hereunder, and shall not thereby concede liability or waive any provision of this Guarantee. If the Company shall exercise its rights under this paragraph, it shall do so diligently.
- (b) If the Company elects to exercise its options as stated in Paragraph 4(a) the Company shall have the right to select counsel of its choice (subject to the right of such Assured to object for reasonable cause) to represent the Assured and shall not be liable for and will not pay the fees of any other counsel, nor will the Company pay any fees, costs or expenses incurred by an Assured in the defense of those causes of action which allege matters not covered by this Guarantee.
- (c) Whenever the Company shall have brought an action or interposed a defense as permitted by the provisions of this Guarantee, the Company may pursue any litigation to final determination by a court of competent jurisdiction and expressive reserves the right, in its sole discretion, to appeal from an advigudgment or order.

(d) In all cases where this Guarantee permits the Company to prosecute or provide for the defense of any action or proceeding, an assured shall secure to the Company the right to so prosecute or provide for the defense of any action or proceeding, and all appeals therein, and permit the Company to use, at its option, the name of such Assured for this purpose. Whenever requested by the Company, an Assured, at the Company's expense, shall give the Company all reasonable aid in any action or proceeding, securing evidence, obtaining witnesses, prosecuting or defending the action or lawful act which in the opinion of the Company may be necessary or desirable to establish the title to the estate or interest as stated herein, or to establish the lien rights of the Assured. If the Company is prejudiced by the failure of the Assured to furnish the required cooperation, the Company's obligations to the Assured under the Guarantee shall terminate.

5. PROOF OF LOSS OR DAMAGE

In addition to and after the notices required under Section 2 of these Conditions and Stipulations have been provided to the Company, a proof of loss or damage signed and sworn to by the Assured shall be furnished to the Company within ninety (90) days after the Assured shall ascertain the facts giving rise to the loss or damage. The proof of loss or damage shall describe the matters covered by this Guarantee which constitute the basis of loss or damage and shall state, to the extent possible, the basis of calculating the amount of the loss or damage. If the Company is prejudiced by the failure of the Assured to provide the required proof of loss or damage, the Company's obligation to such assured under the Guarantee shall terminate. In addition, the Assured may reasonably be required to submit to examination under oath by any authorized representative of the Company and shall produce for examination, inspection and copying, at such reasonable times and places as may be designated by any authorized representative of the Company, all records, books, ledgers, checks, correspondence and memoranda, whether bearing a date before or after Date of Guarantee, which reasonably pertain to the loss or damage. Further, if requested by any authorized representative of the Company, the Assured shall grant its permission, in writing, for any authorized representative of the Company to examine, inspect and copy all records, books, ledgers, checks, correspondence and memoranda in the custody or control of a third party, which reasonably pertain to the loss or damage. All information designated as confidential by the Assured provided to the Company pursuant to this Section shall not be disclosed to others unless, in the reasonable judgment of the Company, it is necessary in the administration of the claim. Failure of the Assured to submit for examination under oath, produce other reasonably requested information or grant permission to secure reasonably necessary information from third parties as required in the above paragraph, unless prohibited by law or governmental regulation, shall terminate any liability of the Company under this Guarantee to the Assured for that claim.

6. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS: TERMINATION OF LIABILITY

In case of a claim under this Guarantee, the Company shall have the following additional options:

(a) To Pay or Tender Payment of the Amount of Liability or to Purchase the Indebtedness.

The Company shall have the option to pay or settle or compromise for or in the name of the Assured any claim which could result in loss to the Assured within the

coverage of this Guarantee, or to pay the full amount of this Guarantee or, if this Guarantee is issued for the benefit of a holder of a mortgage or a lienholder, the Company shall have the option to purchase the indebtedness secured by said mortgage or said lien for the amount owing thereon, together with any costs, reasonable attorneys' fees and expenses incurred by the Assured claimant which were authorized by the Company up to the time of purchase.

Such purchase, payment or tender of payment of the full amount of the Guarantee shall terminate all liability of the Company hereunder. In the event after notice of claim has been given to the Company by the Assured the Company offers to purchase said indebtedness, the owner of such indebtedness shall transfer and assign said indebtedness, together with any collateral security, to the Company upon payment of the purchase price.

Upon the exercise by the Company of the option provided for in Paragraph (a) the Company's obligation to the Assured under this Guarantee for the claimed loss or damage, other than to make the payment required in that paragraph, shall terminate, including any obligation to continue the defense or prosecution of any litigation for which the Company has exercised its options under Paragraph 4, and the Guarantee shall be surrendered to the Company for cancellation.

(b) To Pay or Otherwise Settle With Parties Other Than the Assured or With the Assured Claimant.

To pay or otherwise settle with other parties for or in the name of an Assured claimant any claim assured against under this Guarantee, together with any costs, attorneys' fees and expenses incurred by the Assured claimant which were authorized by the Company up to the time of payment and which the Company is obligated to pay.

Upon the exercise by the Company of the option provided for in Paragraph (b) the Company's obligation to the Assured under this Guarantee for the claimed loss or damage, other than to make the payment required in that paragraph, shall terminate, including any obligation to continue the defense or prosecution of any litigation for which the Company has exercised its options under Paragraph 4.

7. DETERMINATION AND EXTENT OF LIABILITY

This Guarantee is a contract of Indemnity against actual monetary loss or damage sustained or incurred by the Assured claimant who has suffered loss or damage by reason of reliance upon the assurances set forth in this Guarantee and only to the extent herein described, and subject to the Exclusions From Coverage of This Guarantee.

The liability of the Company under this Guarantee to the Assured shall not exceed the least of:

(a) the amount of liability stated in Schedule A or in Part 2;

- (b) the amount of the unpaid principal indebtedness secured by the mortgage of an Assured mortgagee, as limited or provided under Section 6 of these Conditions and Stipulations or as reduced under Section 9 of these Conditions and Stipulations, at the time the loss or damage assured against by this Guarantee occurs, together with interest thereon; or
- (c) the difference between the value of the estate or interest covered hereby as stated herein and the value of the estate or interest subject to any defect, lien or encumbrance assured against by this Guarantee.

8. LIMITATION OF LIABILITY

- (a) If the Company establishes the title, or removes the alleged defect, lien or encumbrance, or cures any other matter assured against by this Guarantee in a reasonably diligent manner by any method, including litigation and the completion of any appeals therefrom, it shall have fully performed its obligations with respect to that matter and shall not be liable for any loss or damage caused thereby.
- (b) In the event of any litigation by the Company or with the Company's consent, the Company shall have no liability for loss or damage until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals therefrom, adverse to the title, as stated herein.
- (c) The Company shall not be liable for loss or damage to any Assured for liability voluntarily assumed by the Assured in settling any claim or suit without the prior written consent of the Company.

9. REDUCTION OF LIABILITY OR TERMINATION OF LIABILITY

All payments under this Guarantee, except payments made for costs, attorneys' fees and expenses pursuant to Paragraph 4 shall reduce the amount of liability pro tanto.

10. PAYMENT OF LOSS

- (a) No payment shall be made without producing this Guarantee for endorsement of the payment unless the Guarantee has been lost or destroyed, in which case proof of loss or destruction shall be furnished to the satisfaction of the Company.
- (b) When liability and the extent of loss or damage has been definitely fixed in accordance with these Conditions and Stipulations, the loss or damage shall be payable within thirty (30) days thereafter.

11. SUBROGATION UPON PAYMENT OR SETTLEMENT

Whenever the Company shall have settled and paid a claim under this Guarantee, all right of subrogation shall vest in the Company unaffected by any act of the Assured claimant.

The Company shall be subrogated to and be entitled to all rights and remedies which the Assured would have had against any person or property in respect to the claim had this Guarantee not been issued. If requested by the Company, the Assured shall transfer to the Company all rights and remedies against any person or property necessary in order to perfect this right of subrogation. The Assured shall permit the Company to sue, compromise or settle in the name of the Assured and to use the name of the Assured in any transaction or litigation involving these rights or remedies.

If a payment on account of a claim does not fully cover the loss of the Assured the Company shall be subrogated to all rights and remedies of the Assured after the Assured shall have recovered its principal, interest, and costs of collection.

12. ARBITRATION

Unless prohibited by applicable law, either the Company or the Assured may demand arbitration pursuant to the Title Insurance Arbitration Rules of the American Land Title Association. Arbitrable matters may include, but are not limited to, any controversy or claim between the Company and the Assured arising out of or relating to this Guarantee, any service of the Company in connection with its issuance or the breach of a Guarantee provision or other obligation. All arbitrable matters when the Amount of Liability is \$2,000,000 or less shall be arbitrated at the option of either the Company or the Assured. All arbitrable matters when the amount of liability is in excess of \$2,000,000 shall be arbitrated only when agreed to by both the Company and the Assured. The Rules in effect at Date of Guarantee shall be binding upon the parties. The award may include attorneys' fees only if the laws of the state in which the land is located permits a court to award attorneys' fees to a prevailing party. Judgment upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

The law of the situs of the land shall apply to an arbitration under the Title Insurance Arbitration Rules.

A copy of the Rules may be obtained from the Company upon request.

13. LIABILITY LIMITED TO THIS GUARANTEE; GUARANTEE ENTIRE CONTRACT

- (a) This Guarantee together with all endorsements, if any, attached hereto by the Company is the entire Guarantee and contract between the Assured and the Company. In interpreting any provision of this Guarantee, this Guarantee shall be construed as a whole.
- (b) Any claim of loss or damage, whether or not based on negligence, or any action asserting such claim, shall be restricted to this Guarantee.
- (c) No amendment of or endorsement to this Guarantee can be made except by a writing endorsed hereon or attached hereto signed by either the President, a Vice President, the Secretary, an Assistant Secretary, or validating officer or authorized signatory of the Company.

14. NOTICES, WHERE SENT

All notices required to be given the Company and any statement in writing required to be furnished the Company shall include the number of this Guarantee and shall be addressed to the Company at the office which issued this Guarantee or to its Home Office: 400 Second Avenue South, Minneapolis, Minnesota 55401, (612) 371-1111.





ORDER NO. 32164965

IMPORTANT: This is not a Plat of Survey. It is furnished as a convenience to locate the land indicated hereon with reference to streets and other land. No liability is assumed by reason of reliance hereon.

Portion of Section 3, Township 25 North, Range 1 East, W.M.



	This Space Provided Fur Recorder's Use
	Filed for Record at Request of: Stewart Title Company KITSAP COUNTY
	AFTER RECORDING MAIL TO: \$3,00 STEWART TITLE CO
	Name DISTRICT NO. 15 NATISKY COUNTY FIRE PROTECTION DEC 6: 1997, 4:19 PM Address 7600 OLD MILITARY ROAD NE CLERK: GILMIRE
	City, State Zip BREMERTON, WA 98310
	Escrow Number: 31019408 Statutory Warranty Deed
	Statutory warrantey been
	THE GRANTOR BRUCE O. ARMSTRONG and BETTY ARMSTRONG, husband and wife
	for and in consideration of TEN DOLLARS AND OTHER GOOD AND VALUABLE CONSIDERATION*** in hand paid, conveys and warrants to KITSAP COUNTY FIRE PROTECTION DISTRICT NO. 15, a Washington Municipal Corporation
	the following described real estate, situated in the County of KITSAP , State of Washington: SEE EXHIBIT 'A' ATTACHED HERETO AND BY THIS REFERENCE MADE A PART HEREOF.
1 / 000	A.F. #: 9312060315 REEL 0767 FR 0766
6	
1	SUBJECT TO: SEE EXHIBIT 'B' ATTACHED HERETO AND BY THIS REFERENCE MADE A PART HEREOF.
	***AND AS PART OF AN EXCHANGE
	DATED this 1st day of December, 1993
	BY PARENTE BRUCE O. ARMSTRONG BETTY ARMSTRONG
	Пу <u>Б</u>
	STATE OF Washington SS:

BRUCE O. ARMSTRONG

By

STATE OF Washington
County of Kitsnp

I certify that I know or have satisfactory evidence that BRUCE O. ARMSTRONG AND BETTY ARMSTRONG

Are the person s who appeared before me, and said person s acknowledged that they signed this instrument and acknowledge it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: December 2nd, 1993

PATRICIA L. DUNLAP Notary Public in and for the State of Washington Residing at BREMERTON
My appointment expires: 04-01-95

THANSACTION EXCISE TAX

PAGE 6 1993

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ORDER NO: 32021436

THE NORTH 1/8TH OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 3, TOWNSHIP 25 HORTH, RANGE 1 EAST, W.M., IN KITSAP COUNTY, WASHINGTON;

EXCEPT COUNTY BOAD;

TOGETHER WITH ACCESS EASEMENT OVER THE NORTH 30 FEET OF THE WEST 7/8THS OF THE SOUTH ONE-HALF OF THE NORTHWEST QUARTER, SAID SECTION 3, LYING EASTERLY OF STATE HIGHWAY NO. 3:

ALSO LOT B OF SHORT PLAT NO. 220 RECORDED UNDER AUDITOR'S FILE NO. 1104749 AND AMENOED BY AUDITOR'S FILE NO. 1171834, BEING A PORTION OF THE NORTHWEST QUARTER, SECTION 3, TOWNSHIP 25 NORTH, HANGE 1 EAST, W.M., IN KITSAP COUNTY, WASHINGTON.

... END OF EXHIBIT 'A' ...

Exhibit b REEL #5-231 FR 60325

SPECIAL EXCEPTIONS:

Engement and the terms and conditions thereof:

FUGET SOUND FOWER & LIGHT COMPANY, A MASS. CORP. Grantee:

ELECTRIC TRANSMISSION AND DISTRIBUTION LINE Purpose:

HAY 70, 1961 Recorded: Recording Number: 336474

This ensement includes the right to enter said premises to make repairs and the right to cut brush and trees which constitute a memore or danger to the electric transmission line located in the street or rand adjoining said premises.

The Grantors, their heirs, successors or assigns, covenant and agrae that they will not do any blanting or discharge any explosives within a distance of 300 feet of anid line without giving reasonable notice in writing to the Grantee its successors or assigns, of intention so to do.

NOTE: The description contained therein is insufficient to specifically locate said casement.

PORTION OF PARCEL 1

Engement, and terms and conditions thereof, affecting a portion of said premises and for the purposes hereinafter stated, as disclosed by instrument recorded on OCTOBER 27, 1971, under Kitaap County Auditor's file No. 1009068 For: INGRESS AND EGRESS

NORTH 30 FEET OF PARCEL II Affects:

Engement, and terms and conditions thereof, affecting a portion of said premises and for the purposes hereinafter stated, as disclosed by instrument recorded on JUNE 3, 1974, under Kitsap County Auditor's File No. 1073670. For . INCRESS, ECRESS AND UTILITIES

NORTH 30 FRET AND WEST 30 FEET OF PARCEL 11 Affects:

Ensement, and the terms and or iditions theroof, affecting a portion of said premises and for the purposes hereinafter stated, as disclosed by instrument recorded on AUGUST 13, 1980, under Kitsap County Audicor's File No. 8008130091.

in favor of: CASCAPE NATURAL GAS CORPORATION
tor: THE RIGHT TO SELECT THE ROUTE FOR AND CONSTRUCT, MAINTAIN, INSPECT, OPERATE, PROJECT, REPAIR, REPLACE, ALTER AND REMOVE A PIPELINE OR PIPELINES FOR THE TRANSPORTATION OF OIL, CAS AND THE PRODUCTS THEREOF

PORTION OF PARCEL I

Ensement, and the terms and conditions thereof, affecting a portion of said premines and for the purposes hereinafter stated, as disclosed by instrument recorded on AUGUST 13, 1980, under Kitsap County Auditor's File No. 8008130092.

CASCADE NATURAL GAS CORFORATION For. THE RIGHT TO SELECT THE ROUTE FOR AND CONSTRUCT, MAINTAIN, INSPECT. OPERATE, PROTECT, REPAIR, REPEACE, ALTER AND REMOVE A PIPELINE OR PIPELINES FOR THE TRANSPORTATION OF OIL, GAS AND THE PRODUCTS THEREOF

FURTION OF PARCEL 11 Affects

Ensement, and the terms and conditions thereof, affecting a portion of said premises and for the purposes hereinsfter stated, as disclosed by instrument

recorded on AUGUST 13, 1980, under Kitsap Councy Auditor's File No. 8008130093.

In favor of: CASCADE MATURAL CAS CORPORATION
For: THE RIGHT TO SELECT THE ROUTE FOR AND CONSTRUCT, MAINTAIN, INSPECT. TE, PROTECT, REPAIR, REPLACE, ALTER AND REMOVE A PIPELINE OR PIPELINES FOR IRANSPORTATION OF OIL, GAS AND THE PRODUCTS THEREOF AFFECT:

PORTION OF PARCEL II

Covenants, conditions, restrictions and easements contained in short plat, Recorded: JULY 6, 1975 Recording No.: 1104749 Records of: KITSAP COUNTY

Amendment thereto recorded June 3, 1977 under Auditor's File No. 1171834; AFFECTS: PARCEL 11

(First Paper Today)

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Charles J Carlson and Belle Carlson

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Lot 13 blk 37 C D Hillman's Navy Yard Addn to Brem as par pl recdd in vol 3 of plats on pg 129 recs of kc

The center in of sd transmission and distribution in to be located as fols: Sd anchor to be located 25 ft h of 12th Ave. If ppty is platted sp agrees to move anchor to nearest k and b lot in in new pla

> Goorge Hammershurg Emelia Hammorsburg

kew Sept 19 1940 by George Hammorsburg and Emelia Hammersburg bf J F Conway np wn res at a (NO Feb 12 1944) ml sp

of the lands and shore lds listed as no 2 above. ting upon that ptn of the gov mea in lying in frut of Lt 4, Sec pt 20 M of R 2 E. W.M. and immediately u of the mea cor bet Secs 27, rwp 25 M of K 2 E. W.M.

Doj of sd action to settle bay lns of the shore lds and td lds ides belonging to pltfs and defds. That sd shore lds and td lds rveyed and the sd bdy lns established a fixed and determined, filet there be appointed one or more competent surveyors or engineers formissioners to prepare and return into court a description by and bounds of the various tts of sd shore lds and td lds claimed trs and the different derts.

That title to sd shore lds and td lds and premises owned by pltrs defts respectively, and to be fixed by a metes and bounds descriptes aforesaid, be quieted in pltfs and defts respectively. That ment be entered establishing the title of pltfs and dfts respecsty to the sd shore lds and td lds by them respectively owned, in dance with the bdies of to be by decree in this action fixed, and determined and that judgment be entered herein quieting their es respectively thereto;

Ballinger, Mutson & Boldt, Attorneys for pltfs

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The center in or set transmission and distribution line and privilege and authority in the true transmission and distribution line, consisting of a single property and the property and to place upon or stell find from such poles transmission, distribution and signal wires, transformers and other nee or convenient transmission, distribution and signal wires, transformers and other nee or convenient transmission, distribution and signal wires, stated and premises sit in kew for an anti-property and the property and proper

Together with the right at all times to the Grantee, its successors assigns, of ingress to and egress from ad lands across adj lands The Grantors for the purpose of constructing, reconstructing, re-ring, renewing altering, changing, patrolling, operating ad in, the right at any time to remove ad polos, wires and appurt from ad a soul

Also the right to the Grantee, its successors and assigns, at all test to cut all brush and timber, and trim all trees standing or grow-

120. a ... a gupon sd lands which, in the opinion of the Grantee, constitute a

the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors their heirs, successors or assigns, covenant and agree or the Grantors the Granto The Grantors their neirs, successors or assigns, covenant and agree that they will not do any blasting or discharge any explosives within distance of 300 feet of sd in without giving reasonable notice in litting to the Grantee its successors or assigns, or intention so to the control of the rights, title, privileges and authority hereby granted shall the control of the rights, title, privileges and authority hereby granted shall the control of the cont

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Richard V Soderlund

Eva Soderlund

Sva Soderlund, hwf bf E W

Soderlund and Eva Soderlund, hwf bf E W

Premarkon (NS Sept 20 38) ml Puget Sound P & L C 144. 1970 of the finweer no wn res at Bremerton (NS Sept 20 38) ml Puget Sound P & L Go Tall proje to 版數

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Asement Dec 15 38 liy 6 39 %1. Ove tvia Johnson and Pearlex Johnson, hwr to Puget Sound Power & Light Co a hass corp

288247 2241-50

cvy & grant to sp (as per form #288246) ---

The SW of the NW exc 4.38 acres in the E pt and exc the N'ly oft thereof, in Sec 22, Twp 26 N R 1 E. W.M.

The center line of said transmission (as per form) ---

s hereby released to the extent, but only to the extent, ned to redinate the sd mtge to the easement herein granted to sd sp. 7 7 7 , 30 Pany mtge on the sd premises held by the third party above named of your hereby released to the extent, but only to the extent, nee to sub-

Pearl Johnson Matti Tolonen

July 6 38 Arvid Johnson and Pearl Johnson, hwf and Matt- Tolonen there compf E. W. Schwed np wn res at Bremerton (NS Sept 20 39) ml P.S.P. & L Co

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7	FASEMENT LOCATI		th 30 feet of th		65 feet of	the above	e described	parcel of
		land.		18				
	te a nare of	this contr	act are the	terns.	condition	is and ag	reements	set
	forth on a s	heet attach	med hereto ma:	rkea "E:	KUIDIE V.	and by	this refe	rence
	incorporated	herein and	l made a part	nereor	•			
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	AND	SOCIAL STATES AND	CARRONICA EN CARRO	SCESSOOG Caranada	CERCOTTORICON NAME OF THE OFFICE OF THE OFFI	gayalaagx Ooddaagoaa		HANGERER
	Grantors shall h	ave the right to us	e and enjoy the above	described	promises, exce	pt as to the r	ights herein gre	inted; and
	Grantors sares not	la build, create or	construct or to perini over or that would in	t to be bui	lt, created or	constructed a	any obstruction	, building,
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		enstructed by Gran	itae ácross lands unda	r cultivation	shall, at the	time of const	ruction thereof,	be paried
			to assign this grant in	whole or	in part includ	ding, without	limitation, the	a right of
	essignment under er fide indebtedness of	y presently outsta	unding or future mor	gage or m	ortgages give	n to secure a	any bonds or c	ther bona
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	ministrators, persona	d representatives.	ions of this contract successors and assign:	s of the per	ties heroto,			
	TO HAVE AN	bist dIOH OF C	right-of-way and eas long thereafter as a	ement unto	said Grantee	, its successo	ors and assigns	until such
	IN WITNESS	whereof the Gren	tors herein have exe	cuted this c	onveyance this	44 day	of Quigner	19 80
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"EXHIBIT A"

- 1. The Grantee has provided a boundary line survey prepared by Jones Associates, Inc. of Seattle, Washington, and agrees that the furnishing of the said survey was part of the consideration of the foregoing Right of Way Contract.
- 2. As further consideration for the execution of the said contract, the Grantee agrees to deliver ten cords of alder and maple wood of not less than twelve inches (12") in diameter in lengths of between eight (8) and ten (10) feet to the home of Bruce Armstrong, 16479 Pearson Road, N.E., Poulsbo, Washington 98370, not later than October 1, 1980.
- 3. The Grantee agrees to construct and install aluminum barrier gates at the easterly and westerly termini of the easement herein conveyed not later than March 1, 1981, with appurtenant devices on each gate so that the same may be locked.
- 1. Both parties are aware that the northerly boundary line of the Grantor's property as shown on the Jones Associates, Inc. survey lies northerly of an existing fence line and that the property immediately adjacent to the Grantor's property on the northerly side thereof makes claim by adverse possession to title to the said fence line. Since the matter has not been adjudicated in court and the Grantee must install a pipeline prior to any possible settlement or adjudication of the exact location of the Grantor's northerly boundary line, the Grantee covenants to install its pipeline as close as feasible to the existing fence line on the coutherly side thereof and in the event, either by settlement or by court adjudication, Grantor's northerly boundary line shall be determined to be the said fence line, the thirty-foot easement herein conveyed shall be the thirty feet immediately to the south of the said fence line. If, however, the Grantor's northerly boundary line shall be determined to be northerly of the said fence line of the installed pipeline, either by adjudication by a court of competent jurisdiction, or by the Grantor's agreement with the owner of the property adjoining the Grantor's property on the northerly side thereof, the Grantes shall convey to the Grantor or his successors in interest the southerly fifteen feet of easement herein conveyed in return for a grant from the Grantor or his successor in interest of an easement for fifteen feet immediately adjacent to the said fence line on the northerly side thereof.

PELL208FR1192

RETURN ADDRESS	3020174
Matty & Templeton	
3212 NW Byron Street #104	##117 € TEMPLETON ************************************
Silverdale, WA 98383	-
)	
Please print neatly or type information	
Document Title(s)	
Boundary Line Adjustment	
Reference Numbers(s) of relat	ed documents
	Additional Reference#'s on page
Grantor(S) Last name, first name, middl	le initials
Thomas R. & Opal M. Sitton	James W. & Patricia A. Smith
Kevin S. & Elizabeth C. Smith	Kitsap County Fire Dist. #15
	Additional Grantors on page
Grantee(S) Last name, first name, midd	lle initials
Thomas R. & Opal M. Sitton	James W. & Patricia A. Smith
Kevin S. & Elizabeth C. Smith	Kitsap County Fire Dist, #15
	Additional Grantees on page
Legal Description (abbreviated for	m: i.e. Plat name, lot, block; section, township, range, quarter/quarter)
•	n 3, Township 25 North, Range 1 East, W.M.
Assessor's Property Tax Parce	2501-1-019-2000
	2501-1-043-2000 032501-1-020-2007

The Auditor/Recorder will rely on the information provided on this form. The staff will not read the document to verify the accuracy or completeness of the indexing information provided herein.

Additional Tax Parcel/Account Number's on page

BOUNDARY LINE ADJUSTMENT THIS DECLARATION MADE THIS day of April by THOMAS R. & OPAL M. SITTON "Declarant(s)" as by THOMAS R. & OPAL M. SITTON "Declarant(s)" as owners of the real property legally described hereinsfter as "PARCEL 'A'". 2nd by JAMES P. & PATRICIA A. SMITH "Declarant(s)" as owners of the real property legally described hereinsfter as "PARCEL 'B'", 3rd by REVIN S. & ELIZABETH C. SMITH "Declarant(s)" as owners of the real property legally described hereinsfter as "PARCEL 'C'", 4th by JAMES P. & PARRICIA A. SMITH hereinsfter as "PARCEL 'D'", 5th by KITSAP COUNTY FIRE DISTRICT NO. 15 "Declarant(s)" as owners of the real property legally described hereinsfter as "PARCEL 'D'", 5th by KITSAP COUNTY FIRE DISTRICT NO. 15 "Declarant(s)" as owners of the real property legally described hereinsfter as "PARCEL 'E'", who wish to adjust the common property lines between said "PARCELS" without creating any additional lot, tract, parcel or site.

CURRENT "PARCEL 'A'" is legally described as:

TAX ACCOUNT NUMBER 032501-1-019-2000.

LOT "A" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER
1134384, RECORDS OF KITSAF COUNTY, WASHINGTON.

CURRENT "PARCEL 'B'" is legally described as:

TAX ACCOUNT NUMBER 032501-1-041-2002. LOT "B" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER 1134384, RECORDS OF KITSAP COUNTY, WASHINGTON.

CURRENT "PARCEL 'C'" is legally described as:

TAX ACCOUNT NUMBER 032501-1-042-2001.

LOT "C" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER
1134384 RECORDS OF KITSAP COUNTY, WASHINGTON.

CURRENT "PARCEL 'D'" is legally described as:

TAX ACCOUNT NUMBER 032501-1-043-2000. LOT "D" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER 1134384, RECORDS OF KITSAP COUNTY, WASHINGTON.

CURRENT 'PARCEL 'E" is legally described as:

TAX ACCOUNT NUMBER 032501-1-020-2007.
THE NORTH 1/5 OF THE SOUTHWEST QUARTER, OF THE NORTHEAST QUARTER, SECTION J, TOWNSHIP 25 NORTH, RANGE 1 EAST, W.M., KITSAP COUNTY, WASHINGTON.

NEW "PARCEL 'A'" shall be legally described as:

LOT "A" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER 1134384, RECORDS OF KITSAP COUNTY, WASHINGTON.
TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL:
THAT PORTION OF THE NORTH ONE-FIFTH {1/5} OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER, SECTION J, TOWNSHIP 25 NORTH, RANGE 1 EAST, M.M., IN KITSAP COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHEAST CORNER OF THE ABOVE SAID SUBDIVISION;
THENCE ALONG THE EAST LINE THEREOF S 03' 23' 13" W - 9.76 FEET TO THE HEREIN DESIGNATED POINT "A"; THENCE SOUTHWESTERLY ON A 35-FOOT RADIUS CURVE TO THE RIGHT, THE CENTER OF WHICH BEARS N 53' 24' 23" W, THROUGH A CENTRAL ANGLE OF 40' 00' 47", FOR AN ARC DISTANCE OF 24.44 FEET TO POINT OF TANGENCY; THENCE S 76' 36' 24" W - 43.85 FEET; THENCE N 87' 42' 58" W - 197.41 FEET TO HEREIN DESIGNATED POINT "C"; THENCE N 03' 14' 30"E - 33.13 FEET TO A POINT ON THE NORTH LINE OF THE ABOVE SAID SUBDIVISION; THENCE ALONG LAST SAID LINE S 88' 15' 32" E - 258.73 FEET TO THE POINT OF BEGINNING EXCEPT PORTION IF ANY FOR COUNTY ROAD (CENTRAL VALLEY ROAD).



3020174 Page: 2 of 8 05/28/97 12:39P Kitsap Co, WA

Declarant(s)/Owners of original parcel(s):

Mailing Address

Name

City/Zip

liquis	14101 Central Valley Road NW, Poulsbo, WA 98370
Thomas R. 6 Opal M. Sitton	14107 Central Valley Rd NW. Poulsho, WA 98370
James W. & Patricia A. Smith	
Voulo C & Flischeth C. Smith	14095 Central Valley Rd NW, Poulsbo, WA 98370
James W. & Patricia A. Smith	T4107 Central Valley Rd NW, Poulsbo, WA 98370
	7600 Old Military Road NE, Bremerton, WA 98311
Kitsap county 1112 52017 515	harata have executed this
IN WITNESS WHEREO	P, the parties hereto have executed this te first above written.
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eaulo:	e:Ha
- Thomas A.	1 max
STATE OF WASHINGTON)	
COUNTY OF KITSAP	Thomas R. Sitton and
ON THIS DAY DEFE	Thomas R. Sitton and probably appeared before me Thomas R. Sitton and to me known to be the individual(s) described the within and foregoing peclaration and the within and foregoing pecuants and the within and foregoing pecuants and the pecuants are the pecuants are the pecuants are the pecuants are the pecuants and the pecuants are the pecualts are the pecuants are the pec
Opal M. Sitton	the within and foregoing Declaration and
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act slower my h	and and official seal this of 7771 day
MACH IN COLOR	NOTARY PUBLIC, in and for the State of
The same of the sa	Washington, residing at Belmerton My Commission expires: 8-46-98
	3020174 Page: 3 of 8 95/28/97 12:39P MATTY & TEMPLETON BLR \$15.60 Kitsap Co, HA

STATE OF WASHINGTON) COUNTY OF KITSAP On this day personally appeared before me JAHES W. SMITH and PATRICIA A. SMITH, to me known to be the individuals described in and who executed the within and foregoing Declaration and acknowledged that they signed the same as their free and voluntary act.

GIVEN HANGET my hand and official seal this Bed day of pull NOTARY PUBLIC in and for the State of Washington, residing at:

My Commission Expires: 1-16-98

STATE OF WASHINGTON)

STATE OF WASHINGTON)

SS. COUNTY OF KITSAP COUNTY OF KITSAP) On this day personally appeared before me KEVIN 3. SHITH and ELIZABETH
C. SMITH, to me known to be the individuals described in snd who executed the
within and foregoing Declaration and acknowledged that the signed the same
as the famous of the same as the famous of the same
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GIVEN under my hand and official seal this 24th day of April 1997. Wibeat. Andews of Washington, residing at: <u>Being Cron</u> My Commission Expires: 8-16-98 338,740

de distantina



3020174 Page: 4 of 8 85/28/97 12:39P Kitsap Co, WR STATE OF WASHINGTON) : ss.
COUNTY OF KITCH
KING

On this day personally appeared before me KEVIN S. SMITH, to me known to be the individual described in and who executed the within and foregoing Declaration and acknowledged that he signed the same as his free and voluntary act.

GIVEN under my hand and official seal this 15^{19} day of N

1997.

And Grott

NOTARY PUBLIC in and for the State of Washington, residing at:

Mercer (Sland

My Commission Expires: 2/9/9%



NEW "PARCEL 'B'" shall be legally described as:

LOT "B" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER 1134384, RECORDS OF KITHAP COUNTY, WASHINGTON. TOGETHER WITH THE FOLLOWING DESCRIBED PARCELL TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL!
THAT PORTION OF THE NORTH ONE-FIFTH (1/5) OF THE SOUTHWEST QUARTER
OF THE NORTHEAST QUARTER, SECTION 3, TOWNSHIP 25 NORTH, RANGE 1
EAST, W.M., KITSAP COUNTY, MASHINGTON, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTHEAST CORNER OF THE ABOVE SAID SUBDIVISION;
THENCE ALONG THE NORTH LINE OF SAID SUBDIVISION N 88: 15' 32" W 258.73 PEET TO THE TRUE POINT OF BEGINNING, THENCE CONTINUING N
88' 15' 32" W - 268.09 FEET; THENCE LEAVING SAID LINE 8 03' 14' 30"
W - 30.59 FEET; THENCE 8 87' 42' 58" E - 268.04 FEET TO A POINT
THAT BEARS 8 03' 14' 30" WEST FROM THE TRUE POINT OF BEGINNING;
THENCE N 03' 14' 30" E - 33.13 FEET TO THE TRUE POINT OF BEGINNING.

NEW "PARCEL 'C'" shall be legally described as:

LOT "C" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER 1134384 RECORDS OF KITSAP COUNTY, WASHINGTON. 1134364 RECORDS OF KITSAP COUNTY, WASHINGTON.
TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL.
THAT PORTION OF THE NORTH ONE-FIFTH (1/5) OF BOUTHWEST QUARTER OF
THE NORTHEAST QUARTER, SECTION 3, TOWNSHIP 25 NORTH, RANGE 1 EAST,
W.M., KITSAP COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTHEAST CORNER OF THE ABOVE SAID SUBDIVISION;
THENCE ALONG THE NORTH LINE OF SAID SUBDIVISION N 88° 15' 32" W 526.82 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING N 88°
15' 32" W - 268.09 FEET; THENCE LEAVING SAID LINE S 03' 14' 30" W 30.01 FEET; THENCE S 86' 15' 32" W - 207.08 FEET; THENCE S 87' 42'
58" E - 61.00 FEET TO A POINT THAT BEARS S 03' 14' 30" W, FROM THE
TRUE POINT OF BEGINNING; THENCE N 03' 14' 30" B - 30.59 FEET TO THE

NEW "PARCEL 'D'" shall be legally described as:

LOT "D" OF SHORT PLAT NO.465, AS RECORDED UNDER AUDITOR FILE NUMBER 1134384, RECORDS OF KITSAP COUNTY, WASHINGTON.
TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL: TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL:
THAT PORTION OF THE NORTH ONE-FIFTH (1/5) OF SOUTHWEST QUARTER OF
THE NORTHEAST QUARTER, SECTION 3, TOWNSHIP 25 NORTH, RANGE 1 EAST,
W.M., KITSAP COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
COMMERCING AT THE NORTHEAST CORNER OF THE ABOVE SAID SUBDIVISION;
THENCE ALONG THE NORTH JINE OF SAID SUBDIVISION BS. 15' 32" W 794.91 FEBT TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING N 88'
15' J2" W - 516.18 FEBT TO THE NORTHWEST CORNER OF SAID
SUBDIVISION; THENCE ALONG THE WEST LINE OF SAID SUBDIVISION S 03'
14' JO" W - 30.01 FEBT; THENCE S 88' 15' J2" E - 516.18 FEBT TO A
POINT THAT DEARS 8 03' 14' J0" WEST FROM THE TRUE POINT OF
DEGINNING; THENCE N 03' 14' J0" E - 30.01 FEBT TO THE TRUE POINT OF DEGINNING.

NEW "PARCEL 'E'" shall be legally described as:

THE NORTH ONE-FIFTH (1/5) OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER, SECTION 3, TOWNSHIP 25 NORTH, RANGE 1 EAST, W.M., KITSAP COUNTY, WASHINGTON.

EXCEPTING THE FOLLOWING DESCRIBED PORTION:
BEGINNING AT THE NORTHEAST CORNER OF THE ABOVE SAID SUBDIVISION;
BEGINNING AT THE NORTHEAST CORNER OF THE ABOVE SAID SUBDIVISION;
THENCE ALONG THE EAST LINE THEREOF 8 03° 23' 13" W - 9.76 FEET TO THE HEREIN DESIGNATED POINT "A"; THENCE SOUTHWESTERLY ON A 35-FOOT RADIUS CURVE TO THE RIGHT, THE CENTER OF WHICH BEARS N 53° 24' 23" W, THROUGH A CENTRAL ANGLE OF 40° GO' 47", FOR AN ARC DISTANCE OF 24.44 FEET TO POINT OF TANGENCY; THENCE S 76° 36' 24" W - 43.85 FEET; THENCE N 88° 15' 32" W - 723.26 FEET TO POINT ON THE WEST LINE OF THE ABOVE SAID SUBDIVISION; THENCE ALONG LAS SAID LINE N 03° 14' 30" E - 30.01 TO THE NORTHMEST CORNER OF SAID SUBDIVISION THENCE ALONG THE NORTH LINE OF SAID SUBDIVISION S 88' 15' 32" E - 1311.09 FEET TO THE POINT OF BEGINNING.

EXCEPT PORTION IF ANY FOR COUNTY ROAD (CENTRAL VALLEY ROAD).

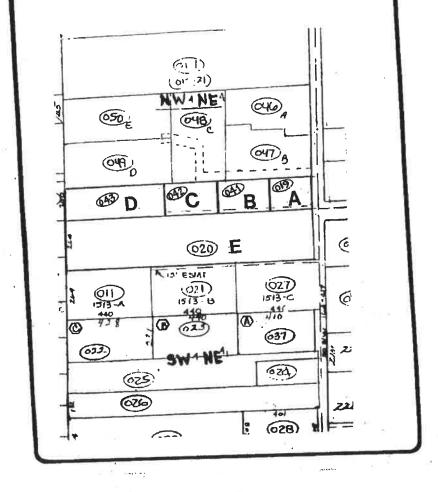
EXCEPT PORTION IF ANY FOR COUNTY ROAD (CENTRAL VALLEY ROAD).



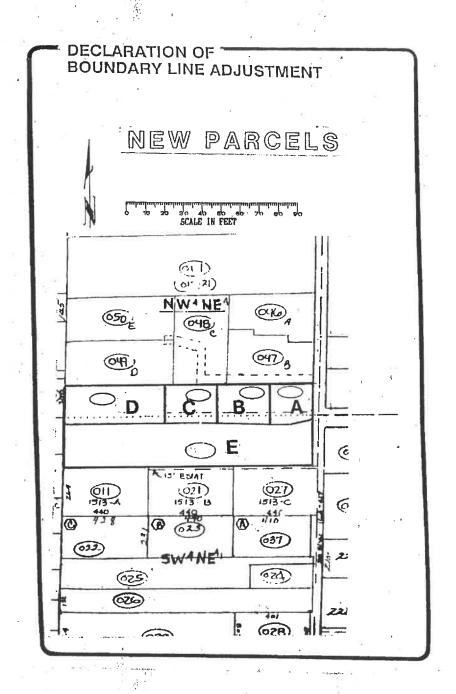
3020174 Page: 6 of 8 85/28/97 12:39P Kitsap Co, WR

DECLARATION OF BOUNDARY LINE ADJUSTMENT

CURRENT PARCELS









3228588 Page: 1 of 3 12/28/199908:518 Kitsan Co. UR

When Recorded, Return To:

Kitsap County Public Works				
614 Division Street	_			
Port Orchard, WA 98366				

DECLARATION OF COVENANT ASSOCIATED WITH MAINTENANCE AND OPERATION OF STORM DRAINAGE FACILITIES

Grantor: Roy Lusk, Central Kitsap Fire & Rescue	Additional Grantor:
Grantee: Kitsap County	Additional Grantee:
Legal Description: SW ¼, NE¼, Sec 3,T. 25, R. 1 E.	W.M.
Assessor's Tax Parcel No: 032501-1-020-2007	
Reference Auditor File No.: 3020174	Additional No.:
Whereas Kitsap County, a Political Subdivision	on of the State of Washington, has rights under
County Ordinances, Codes and Washington State State	
County Department of Public Works has issued a Site De	
for the development known as, Station 42, which contain	
	(s) of the real property situated in Kitsap County,
State of Washington, and legally described as follows:	.,
RESULTANT PARCEL E OF BOUNDARY LAUDITOR'S FILE NO. 3020174; THE NORTH ONE-FIFTH (1/5) OF THE SOUT QUARTER, SECTION 3, TOWNSHIP 25 NORTH, WASHINGTON.	HWEST QUARTER OF THE NORTHEAST RANGE 1 EAST, W.M., KITSAP COUNTY,
EXCEPTING THE FOLLOWING DESCRIBED PORT BEGINNING AT THE NORTHEAST CORNER OF ALONG THE EAST LINE THEREOF SOUTH 03° DESIGNATED POINT "A"; THENCE SOUTHWEST THE RIGHT, THE CENTER OF WHICH BEARS CENTRAL ANGLE OF 40° 00' 47", FOR AN AR TANGENCY; THENCE SOUTH 76° 36' 24" WEST 526.45 FEET; THENCE NORTH 88° 15' 32" LINE OF THE ABOVE SAID SUBDIVISION; THEN 30" EAST 30.01 FEET TO THE NORTHWEST ALONG THE NORTH LINE OF SAID SUBDIVISION THE POINT OF BEGINNING.	THE ABOVE SAID SUBDIVISION; THENCE 23' 13" WEST 9.76 FEET TO THE HEREIN STERLY ON A 35-FOOT RADIUS CURVE TO NORTH 53° 24' 23" WEST, THROUGH A C DISTANCE OF 24.44 FEET TO POINT OF T 43.85 FEET; THENCE NORTH 87° 42' 58" WEST 723.26 FEET TO POINT ON THE WEST ACE ALONG LAST SAID LINE NORTH 03° 14' CORNER OF SAID SUBDIVISION; THENCE

The Owner(s), their heirs, successors or assigns, hereby covenant and agree that:

- Kitsap County, or its designee, shall have the right to ingress and egress over the above described property for the purpose of inspecting, sampling and monitoring stormwater facility components and discharges.
- 2. If, at any time, Kitsap County, reasonably determines that maintenance or repair work is required to be done to the existing and accepted stormwater facilities installed on the property described above (which will mean repair or clean out of the existing facilities only to the same standards as originally installed and accepted), the Director of the Department of Public Works or his/her designee shall give the

Owner(s) seven (7) days notice that Kitsap County intends to perform such maintenance or repair work, or to have them performed by others.

If the Owner(s) have not completed or are not diligently pursuing their maintenance or repair work to the facilities and it becomes necessary for Kitsap County to perform the work, the Owner(s) will assume responsibility for the cost of such maintenance or repair work and will reimburse Kitsap County within

thirty (30) days of receipt of the invoice for any such work performed. Overdue payments will require payment of interest at the current legal rate for liquidated judgments, and any costs or fees incurred by Kitsap County, should any legal action be required to collect such payments, will be borne by them parties responsible for said reimbursements.

3. If, at any time, Kitsap County reasonably determines that the existing and accepted stormwater facilities installed on the property described above poses a hazard to life and limb, or endangers property, or adversely affects the safety and operations of a public way, due to failure, damage or non-maintenance, and that the situation is so adverse as to preclude written notice to the Owner(s), the Director of the Department of Public Works may take the measures necessary to eliminate the hazardous situation (which will mean repair or clean out of the existing facilities only to the same standards as originally installed and accepted) provided the Director, or his/her designee, has first made a reasonable effort to locate said Owner(s) before acting.

The Owner(s) will assume responsibility for the cost of such maintenance or repair work and will reimburse Kitsap County within thirty (30) days of receipt of the invoice for any such work performed. Overdue payments will require payment of interest at the current legal rate for liquidated judgments, and any costs or fees incurred by Kitsap County, should any legal action be required to collect such payments, will be bome by the parties responsible for said reimbursements.

- 4. The Owner(s) will keep Kitsap County informed at all times as to the name, address and telephone number of the contact person responsible for the performance of maintenance or repair work to the erosion and sedimentation control facilities.
- 5. The Owner(s) agree to hold harmless and indemnify Kitsap County, or its designee, from any and all claims arising from any activity Kitsap County undertakes on the property described above if it becomes necessary for Kitsap County to conduct maintenance or repair work.

These covenants are intended to protect the value and desirability of the real property described above, and to benefit all the citizens of Kitsap County. They shall run with the land and be binding on all parties having or acquiring from the Owner(s), their heirs, successors or assigns, any right, title or interest in the property or any part thereof. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of all the citizens of Kitsap County.



3228588 Page: 2 of 3 12/28/199988:518 Kitsap Co. WR Roy Lusk,
Central Kitsap Fire and Rescue

○ Owner

Note: Signatures and Notary Seal <u>must NOT go into</u>

<u>1 inch border line of document!</u>

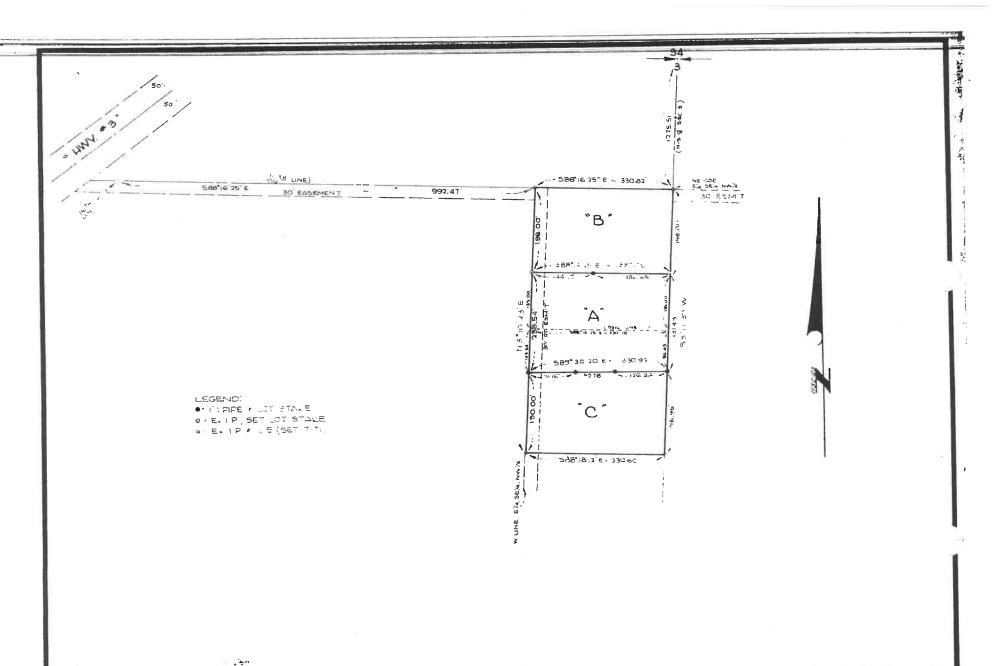
STATE OF WASHINGTON))§	
COUNTY OF KITSAP),	
A at.	. 1	
On this 3/20 day o	f Kllemler	, 1999, before me, the undersigned
a Notary Public in and for the Sta	te of washington, duty	commissioned and sworn, personally to me known to be the individual
described in and who executed the	within and foregoing inst	rument, and acknowledged that
HE	signed the same as	1415
free and voluntary act and deed, for that he was authorized to execute sa	r the uses and purposes and instrument.	therein mentioned, and on oath stated
WITNESS MY HAND AN	D OFFICIAL SEAL this	day of
		Market Control of the
Notary Public in and for the		ALL CONSTANT
State of Washington, residing at	lulsko	3/60-
State of Washington, residing at My Commission expires. Mug. 1	39 ROO3	0.00
Note: Signatures and Notary Sea		A SANTON S
1 inch border line of docu		100
		William Share
		Notary Stamp Here

APPROVED FOR RECORDING BY THE KITSAP COUNTY DEPARTMENT OF PUBLIC WORKS

James E. Barnard 12/27/99
DATE



3228588 Page: 3 of 3 12/28/199908:518 Kitsap Co. WA



AUD. NO: 7706300113

AUDITOR'S CERTIFICATE
FILED FOR RECORD THIS DAY OF TOWNSHIP
19 11. AT THE RECORD THIS SUBJECT OF ROATS ENGINEERING. IN JOURNAL PROJECT OF ROATS ENGINEERING. IN JOURNAL PAGE

LOUNTY AUDITOR OF DEPTY PUDITOR

AUDITOR'S FILE
SURVEY NO.

SURVEYORS CERTIFICATE THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY WE OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY
RECORDING ACT AT THE REQUEST OF
C RITTER

Leage Coats



DRAWN	8LS	
DATE	4-14-77	
FIELD BOOK	1153/2-4	
JOB ORDER	77.5099	
CHECKED	1153/2-4	
	DATE FIELD BOOK JOB ORDER	

SCALE: 1" = 100 "

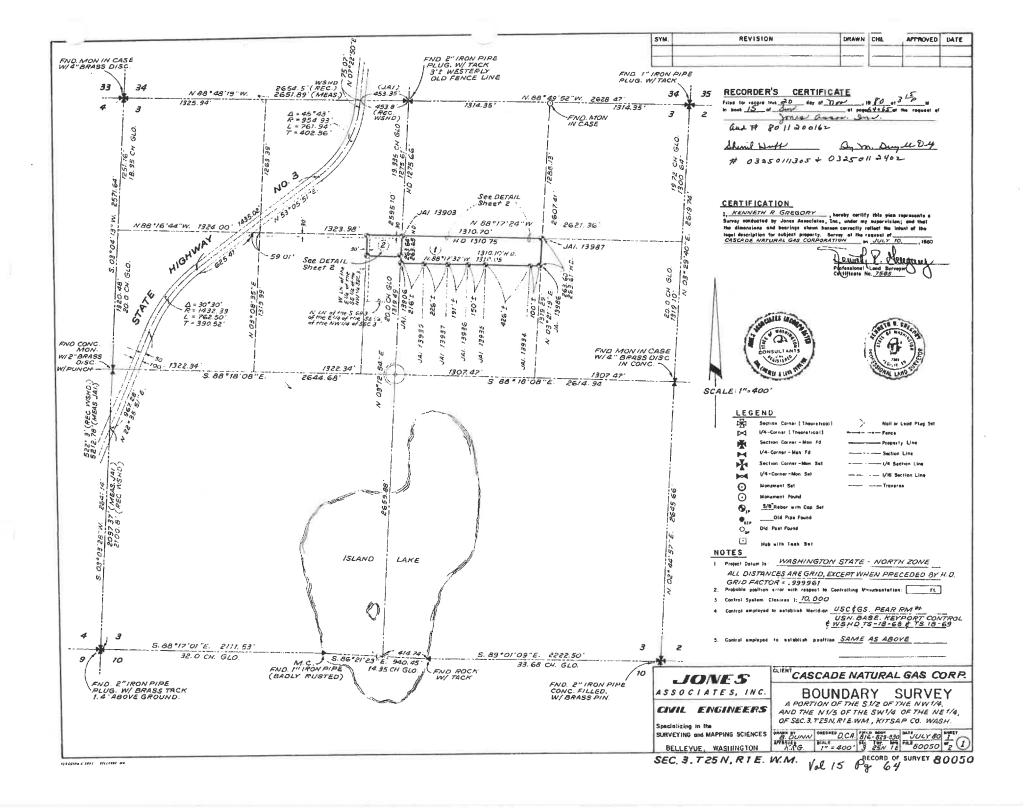
SURVEY OF PORTICIA E/4 SE/4 NW/4

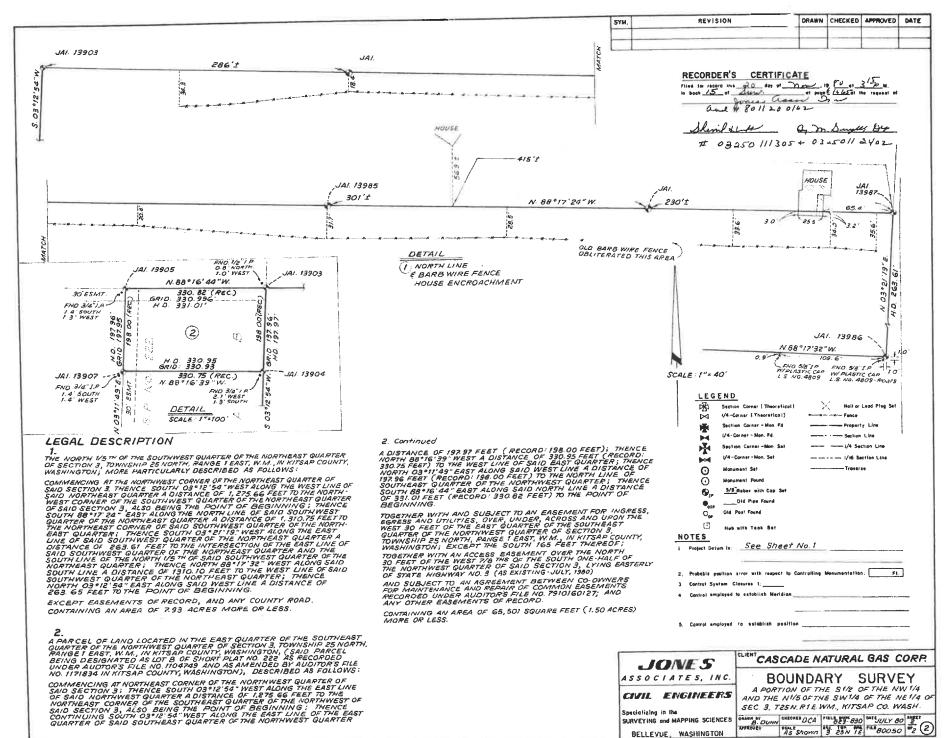
SEC. 9, T. 25 N., R.I E., W. M. KITSAP CO WN

ROATS ENGINEERING

ENGINEERS PLANNERS SURVEYORS

P 0. BOX 995 98370 POULSBO, WASHINGTON TELEPHONE: 779-3939





Fire Station 45 - North Perry

Fire Station 45 was built in 1965 and is CKFR's oldest station staffed with career firefighters on a 24/7 basis. Originally designed as an all-volunteer station, it had several small remodels over the years to accommodate full-time firefighters. Consequently, the layout of this station is inefficient and can only marginally satisfy its current operational mission.



Fire Station 45 – North Perry 3725 Trenton Avenue NE. Bremerton. WA 98310

Fire Station 45 is two stories. The main floor includes two apparatus bays,

living quarters to accommodate four on-duty firefighters, a small work area, and an obsolete hose drying tower. The apparatus bays have low ceilings and are short. This limits the apparatus assigned to the station. The single restroom and shower area provide no privacy for male and female personnel. Neither the kitchen nor restrooms are ADA compliant. The building lacks fire sprinklers and the mechanical and electrical systems are antiquated.

The daylight basement includes a fitness area and a maze of storage rooms for a variety of supplies and equipment. There is no ADA access between floors.

The station is maintenance-intensive and lacks most features and attributes that would be considered standard design practice in a modern fire station. The station is operationally obsolete in many respects and is nearing the end of its useful life.

Observed Deficiencies

- Station is at risk of being unsafe to occupy after a design-level earthquake
- Masonry hose tower poses serious falling hazard in the event of a design-level earthquake, causing more damage to the building and occupants
- Minimal decontamination facilities
- Poor storage for bunker gear
- Does not meet current ADA accessibility requirements restrooms, kitchens, doorways, lobby entrance, and access to lower floor
- Lack of fire sprinklers
- Inadequate storage for equipment and supplies throughout the station
- Insufficient number of apparatus bays to meet today's deployment needs
- Materials and finishes are worn out, especially at restrooms and kitchen some have been in place for 54 years





- Apparatus bays do not meet today's depth standards and in some instances do not have the dimensional vehicle clearances required by WAC 296-305, Safety Standards for Fire Fighters
- Single, shared restroom and shower areas for men and women
- High energy costs from inefficient light fixtures
- High energy costs due to lack insulation and poor windows that are not in compliance with current energy codes
- General inefficient use of space having been originally designed as a volunteer-only fire station
- Antiquated mechanical, electrical, and plumbing systems
- Apparatus bay dimensions which limit the district vehicles that can be deployed
- Low level of building security exterior doors, visibility of entrances, parking areas

Proposed Improvements

The current Fire Station 45 will be demolished and replaced with the district's Prototype Station Plan. The new Fire Station 45 will occupy the footprint of the current station, with improvements surrounding it for a better apron, visitor parking, and secure firefighter parking.

The new Fire Station 45 will include living quarters to accommodate four firefighters, three single deep apparatus bays, work areas, and a small public lobby. The station will be approximately 8,800 square feet in size.

The estimated construction cost for replacing this fire station would be \$6,054,456 in 2019 dollars. This amount does not include project expenses, nor inflation, which will depend on the construction start date.

End of Fire Station 45 - North Perry



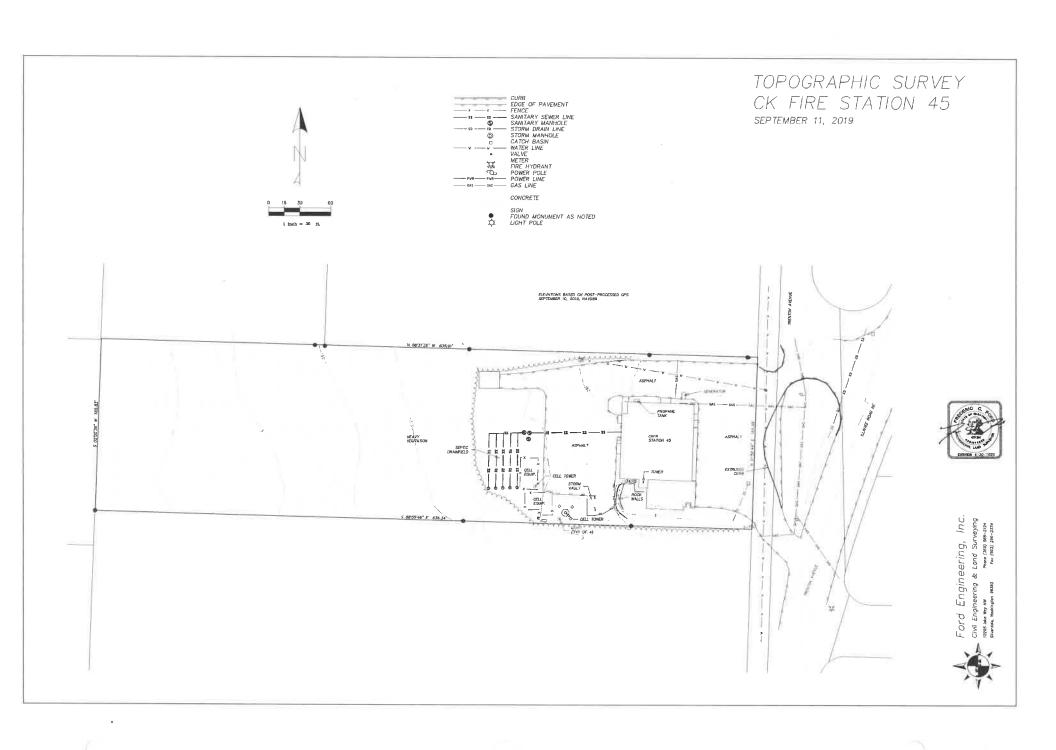


Program Requirements

		Fire Station	Fire Station	Fire Station	Fire Station	Fire Station
		42	45	52	53	57
		Island Lake	North Perry	Anderson Hill	Seabeck	Coho Run
Operations						
Apparatus Bay (3-bays, back-in)	54' x 50'	2,700	2,700	2,700	2,700	2,700
Decon	10' x 11'	110	110	110	110	110
Shop	8" x 10"	80	80	80	80	80
Clean Project Room	16' x 12'6"	200	200	200	200	200
App Bay Restroom	8" x 12"	96	96	96	96	96
Bunker Gear Storage	15' x 21'	315	315	315	315	315
General Storage	8' x 10'	80	80	80	80	80
App Bay Janitorial	8' x 8'	64	64	64	64	64
Sprinkler Riser / Compressor	6' x 10'	60	60	60	60	60
(4) Sleep Rooms (2) Restroom/Showers Kitchen Dining for 6 Dayroom for 4	(4) 9' x 15' (2) 8' x 12' 14' x 20' 16' x 14' 16' x 19'	540 192 280 224 304	540 192 280 224 304	540 192 280 224 304	540 192 280 224 304	540 192 280 224 304
Fitness	24' x 20'	480	480	480	480	480
Laundry	10' x 12'	120	120	120	120	120
Janitorial	8' x 8'	64	64	64	64	64
Public and Front of the House		96	96	0.5	0.5	
Public Lobby (1) Public Unisex Restroom	8' x 12'	64	64	96 64	96	96
The state of the s	8, x 8,	105717			64	64
Firefighter Work Area Station Officer Office	18' x 20' 10' x 10'	360 100	360 100	360 100	360 100	360 100
Station Officer Office	TO X TO [100	100	100	100	100
Subtotal		6,529	6,529	6,529	6,529	6,529
Mechanical / Electrical	10%	653	653	653	653	653
Circulation	15%	979	979	979	979	979
Total Anticipated Square Fo	otage	8,161	8,161	8,161	8,161	8,161

End of Program Requirements

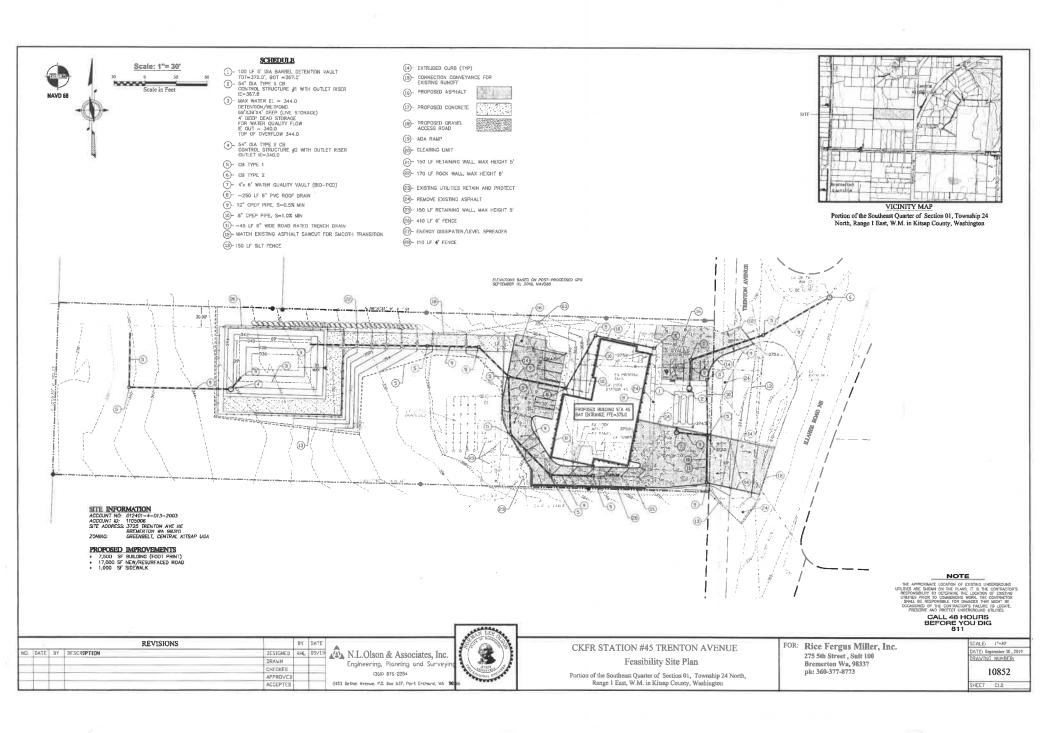


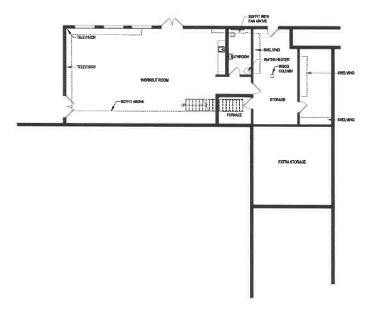




Fire Station 45
Central Kitsap Fire & Rescue
July 23, 2019

RICEJergusmiller



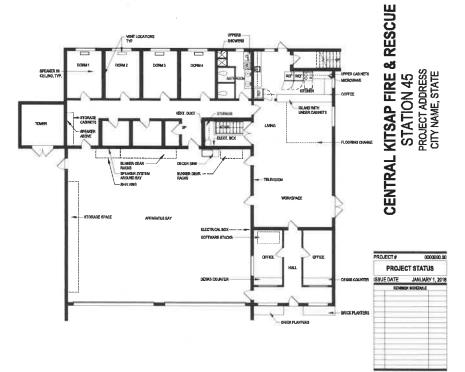


KEY NOTES - FLOOR PLAN

GENERAL NOTES - FLOOR PLAN

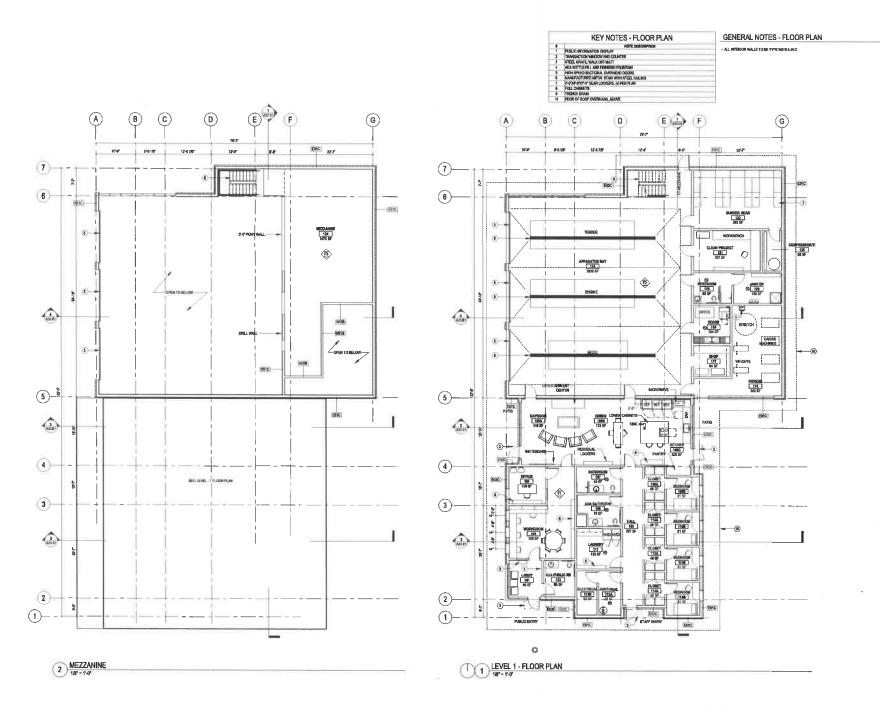
ARCHITECTUS PURSUES VILLA 275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 360-377-373 RFMARCH-COM

NOT FOR CONSTRUCTION



FLOOR PLAN - LEVEL 1

A21.11



RICEJergusmaller

ARCHITECTURE INTERIORS PLANNING VIEW 275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 360-377-8773 RFMARCH,COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE NEW STATION: MODEL



FLOOR PLAN

A21.11



STATION 57 (Prototype; Stations 45, 52, and 53 similar)



STATION 57 (Prototype; Stations 45, 52, and 53 similar)



Central Kitsap Fire and Rescue Bond Study 11/1/2019

Station 45-North Perry

Protoypical New Bldg. Station 45 \$ 4,355,419
Site Work Station 45 \$ 1,080,226

Total direct Today's Dollars \$ 5,435,645

Exclusions:

Escalation
State Sales Tax
Construction Contingency
Architect/Engineering Fees
Permits

Toxic Soils/Materials Removal Construction Management Fees Utility Infrastructure to Site Piling/Special Foundations Wetland Mitigation Jurisdictional/Utility Co. Fees Owner's Consultant Costs Equipment & Furnishings Not Listed
Off Site Work
Builders Risk Insurance
Moving/Relocation Expense
Alternative Delivery-GC/CM, Design-Build
Legal Expense
Land Purchase/Financing Costs
Fire Vehicles/Apparatus/Radio Towers
Project/Bid Market/Code Change Contingency



Prototypical New Building Summary

Gross Floor Area: 8,800 SF Rates Current At September 2019

Desc	Description		Cost/SF	Total Cost
140	From letters		¢07.00	#040.007
A10	Foundations		\$27.38	\$240,907
B10	Superstructure		\$39.75	\$349,760
B20	Exterior Enclosure		\$78.60	\$691,695
B30	Roofing		\$34.62	\$304,670
C10	Interior Construction		\$27.62	\$243,086
C20	Stairs		\$2.84	\$25,000
C30	Interior Finishes		\$23.51	\$206,887
D20	Plumbing		\$34.00	\$299,200
D30	HVAC		\$43.00	\$378,400
D40	Fire Protection		\$6.80	\$59,840
D50	Electrical		\$43.50	\$382,800
E10	Equipment		\$7.88	\$69,355
E20	Furnishings		\$12.49	\$109,898
Z10	General Conditions		\$48.30	\$425,000
		ESTIMATED NET COST	\$430.28	\$3,786,498
MAR	GINS & ADJUSTMENTS			
Desig	gn Contingency-Building	7.0 %		\$265,055
Conti	ractors Overhead & Profit	7.5 %		\$303,866
		ESTIMATED TOTAL COST	\$494.93	\$4,355,419

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descrip	ption	Unit	Qty	Rate	Total Cos
A1010	Standard Foundations				
1	Standard foundation excavation, backfill, haul off	SF	8,800	1.50	13,20
2	Footing drains w/gravel	LF	415	20.00	8,30
3	Add for lateral system footings	EA	4	2,500.00	10,00
4	Continuous footings at exterior	CY	30	550.00	16,66
5	Continuous footings interior	CY	8	550.00	4,18
6	Column footing allowance	CY	34	460.00	15,82
8	Stem walls	SF	1,225	46.00	56,35
9	Waterproofing foundation	SF	1,415	5.85	8,27
	Standard Foundations		.,	\$15.09/SF	\$132,79
A1030	Slab on Grade				
10	Gravel at slab on grade	SF	8,800	0.70	6,10
11	Trench drains @ App bay	LF	103	185.00	19,0
12	8" slab on grade-App Bay	SF	2,830	8.50	24,0
13	4" slab on grade-balance of bldg.	SF	5,970	6.35	37,9
14	Rebar at 8" slab-#5 @ 14" O.C.	Lb	5,822	1.70	9,8
15	Slab depressions, block-outs and columns closures	SF	8,800	0.40	3,5
16	Rigid insulation @ slab perimeter	SF	1,038	3.00	3,1
17	Vapor retarder @ slab	SF	8,800	0.50	4,40
	Slab on Grade			\$12.29/SF	\$108,1
B1020	Roof Construction				
20	Gang nail truss, TJI, plywood roof structure	SF	10,930	32.00	349,70
24	Fireproofing at roof structure	LS	1		Ex
	Roof Construction			\$39.75/SF	\$349,7
B2010	Exterior Walls				
27	Ext wall frame @ openings, glazing areas	SF	2,307	8.00	18,4
28	Exterior wall framing system-insul,sheath,gwb,wrb,clips	SF	6,319	30.35	191,78
29	Misc. flash,trim,seal,caulk exterior wall envelope and screens	SF	8,626	2.65	22,8
30	Red Fiber Cement Siding	SF	2,636	24.00	63,2
31	Wood siding	SF	2,044	24.00	49,0
32	Precast-base perimeter & public entry	SF	1,639	52.00	85,2
279	Ext. signage	LS	1	25,000.00	25,00
				\$51.78/SF	\$455,6

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Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descrip	otion	Unit	Qty	Rate	Total Cost
B2020	Exterior Windows				
35	Ext. glazing systems	SF	1,614	75.00	121,050
	Exterior Windows			\$13.76/SF	\$121,050
B2030	Exterior Doors				
36	High speed overhead sectional doors	EA	3	30,000.00	90,000
39	Exterior doors/frames/hardware-per leaf	EA	5	3,000.00	15,000
40	Misc. exterior door hardware/card/electric	LS	1	10,000.00	10,000
10	Exterior Doors			\$13.07/SF	\$115,000
B3010	Roof Coverings				
44	Membrane roofing system	SF	10,930	18.35	200,566
45	Roofing rough carpentry	SF	10,930	0.65	7,105
46	Roof flashing,coping,sheet metal,	SF	10,930	2.05	22,407
47	Fall protection system	SF	10,930	1.00	10,930
48	Misc roofing accessories, hatch, walkpads, ladders	SF	10,930	0.55	6,012
49	Cladding/work at overhangs	SF	2,130	20.00	42,600
264	Metal caps at roof beams	EA	86	175.00	15,050
	Roof Coverings			\$34.62/SF	\$304,670
C1010	Partitions				
50	Interior partitions	SF	10,095	13.55	136,790
52	Add for interior partition types,ratings	SF	6,562	3.50	22,966
266	Drill Wall/pony wall	SF	162	25.00	4,050
280	Transaction window and int. relite allowance	LS	1	5,000.00	5,000
	Partitions -			\$19.18/SF	\$168,806
C1020	Interior Doors				
53	Pocket door	EΑ	1	2,100.00	2,100
55	Int. HM door/frame/hdwre-per leaf	EΑ	23	2,000.00	46,000
57	Misc. door hardware/ratings/readers	LS	1	5,500.00	5,500
	Interior Doors			\$6.09/SF	\$53,600
C1030	Specialties				
58	Specialties allowance	SF	8,800	2.35	20,680
	Specialties			\$2.35/SF	\$20,680
C2010	Stair Construction				
274	Stair/rails to mezzanine	LS	1	25,000.00	25,000
	Stair Construction			\$2.84/SF	\$25,000
l					

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Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descrip	otion	Unit	Qty	Rate	Total Cost
C3010	Wall Finishes				
60	Interior Painting/sealing	SF	8,800	3.55	31,240
61	Wall protection at apparatus bay walls 8'	SF	1,040	12.00	12,480
62	Ceramic tile wall restrooms/showers	SF	1,485	22.00	32,670
63	Epoxy wall coating at decon and wash alcove-allow 8'	SF	328	16.00	5,248
281	Plam wall janitor rooms	SF	612	9.00	5,508
	Wall Finishes			\$9.90/SF	\$87,146
C3020	Floor Finishes				
66	Floor grates	LS	1	2,500.00	2,500
67	Athletic flooring-fitness room	SF	391	12.00	4,688
68	Polished concrete flooring	SF	7,867	7.50	59,006
69	Epoxy flooring-decon and wash alcove room-allow	SF	192	16.00	3,072
71	Rubber base allowance	SF	8,800	0.40	3,520
72	Ceramic tile base	LF	125	22.00	2,750
268	Ceramic tile flooring	SF	349	22.00	7,671
	Floor Finishes			\$9.46/SF	\$83,207
C3030	Ceiling Finishes				
73	ACT ceilings @ sleep rooms	SF	394	6.50	2,561
74	GWB ceilings-at restrooms/showers	SF	349	12.00	4,188
75	Acoustical cloud @ dayroom	SF	496	30.00	14,880
76	Ceilings-open to structure/seal-paint	SF	8,057	1.85	14,905
	Ceiling Finishes			\$4.15/SF	\$36,534
D2010	Plumbing Fixtures				
77	Plumbing allowance	SF	8,800	34.00	299,200
	Plumbing Fixtures			\$34.00/SF	\$299,200
D3090	Other HVAC Systems and Equipment				
78	HVAC allowance	SF	8,800	43.00	378,400
	Other HVAC Systems and Equipment			\$43.00/SF	\$378,400
D4040	Sprinklers				
79	Fire protection-allowance	SF	8,800	6.80	59,840
	Sprinklers			\$6.80/SF	\$59,840
D5090	Other Electrical Services				
80	Building electrical-allowance	SF	8,800	43.50	382,800
	Other Electrical Services		•	\$43.50/SF	\$382,800

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Description		Unit	Qty	Rate	Total Cost	
E1090	Other Equipment					
81	Extractor/dryer		LS	1	28,500.00	28,500
82	Dishwasher		ΕA	1	1,500.00	1,500
83	Refrigerator/Freezer		EA	3	3,600.00	10,800
84	Range/oven/hood		LS	1	9,800.00	9,800
85	Bunker gear lockers		EA	15	545.00	8,175
86	Cascade fill station-FOIC		LS	1	2,500.00	2,500
87	Hose dryers-FOIO		LS	1		Excl.
88	Misc. equipment/FOIC		SF	8,800	0.35	3,080
273	Washer/Dryer		EA	2	2,500.00	5,000
		Other Equipment			\$7.88/SF	\$69,355
E2010	Fixed Furnishings					
89	Shift lockers		EA	16	1,200.00	19,200
98	Window treatment/shades		SF	1,614	9.85	15,898
99	Casework allowance		SF	8,800	8.50	74,800
		Fixed Furnishings			\$12.49/SF	\$109,898
Z1010	General Conditions					
177	General conditions		Mth	10	42,500.00	425,000
		General Conditions			\$48.30/SF	\$425,000
		ESTIMATED NET COST			\$430.28/SF	\$3,786,498

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Station 45 Site Work

Station 45 Site area: 57,000 SF Rates Current At September 2019

Description	Cost/SF	Total Cost
Odd Otto Domesticus	£4.07	£020.070
G10 Site Preparations	\$4.07	\$232,070
G20 Site Improvements	\$5.48	\$312,460
G30 Site Civil/Mechanical Utilities	\$2.68	\$152,854
G40 Site Electrical Utilities	\$0.96	\$55,000
Z10 General Conditions	\$1.49	\$85,000
ESTIMA	ATED NET COST \$14.69	\$837,384
MARGINS & ADJUSTMENTS		
Design Contingency-Site	20.0 %	\$167,477
Contractors Overhead & Profit	7.5 %	\$75,365
ESTIMATED TOTAL	L COST \$18.95	\$1,080,226

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Station 45 Site Work Detail

Station 45 Site area: 57,000 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
G1010	Site Clearing				
406	Site clearing, hard surface demolition, misc. demolition	LS	1	62,120.00	62,120
	Site Clearing			\$1.09/SF	\$62,120
04000					
G1020	Site Demolition & Relocations	C.E.	0.550	40.00	70.000
283	Building demolitions	SF	6,550	12.00	78,600
	Site Demolition & Relocations			\$1.38/SF	\$78,600
G1030	Site Earthwork				
108	Temporary Erosion Control	SF	57,000	0.50	28,500
407	Earthwork	LS	1	62,850.00	62,850
	Site Earthwork			\$1.60/SF	\$91,350
G2020	Parking Lots				
115	Wheel stops allow	EA	12	125.00	1,500
408	Asphalt, concrete surfacings ,curbs	LS	1	134,035.00	134,035
	Parking Lots			\$2.38/SF	\$135,535
G2040	Sita Davalanment				
124	Site Development Trash enclosure - pad & encloure-allow	SF	572	45.00	25,740
130	Station monument sign/exterior signage-in bldg cost	LS	1	45.00	23,740 Excl.
132	Flagpole	EA	1	3,000.00	3,000
409	Rock wall	SF	800	33.00	26,400
410	Retaining wall	SF	450	44.00	19,800
411	Misctraffic control, fencing,trench	LS	1	33,000.00	33,000
	Site Development			\$1.89/SF	\$107,940
C20E0	Landanina				
G2050	Landcaping	SF	24 500	2.40	60.005
282	Lanscape/irrigation-70%lawn/30%shrubs-trees **Landcaping** **Landcaping**	<u>ог</u>	31,500	2.19	68,985 \$68,985
	Landcaping			\$1.21/SF	Ф00,90 0
G3010	Water Supply				
404	Water system onsite adjust/modify allowance	LS	1	15,000.00	15,000
	Water Supply			\$0.26/SF	\$15,000
G3020	Sanitary Sewer				
405	Sanitary Sewer system onsite adjust/modify allowance	LS	1	15,000.00	15,000
	Sanitary Sewer			\$0.26/SF	\$15,000
ı					
					J

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Station 45 Site Work Detail

Station 45 Site area: 57,000 SF Rates Current At September 2019

Description		Unit	Qty	Rate	Total Cost
G3030	Storm Sewer				
412	Storm drainage systems	LS	1	122,854.00	122,854
	Storm Sewer			\$2.16/SF	\$122,854
G4010	Electrical Distribution				
413	Site electrical-modify lighting, feeders,comm allow	LS	1	55,000.00	55,000
	Electrical Distribution			\$0.96/SF	\$55,000
Z1010	General Conditions				
178	General conditions	Mth	2	42,500.00	85,000
	General Conditions			\$1.49/SF	\$85,000
	ESTIMATED NET COST			\$14.69/SF	\$837,384

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CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for:

Rice Fergus Miller Architecture



Prepared by:

Corbin M. Hammer, P.E., S.E. Principal Engineer

Katherine R. Brawner, P.E. Project Engineer

ReidMiddleton

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1.0 Executive Summary

Seismic screenings and structural evaluations were performed for eight Central Kitsap Fire and Rescue fire facility buildings to investigate seismic deficiencies. All buildings evaluated in this study are low-rise structures and include seven fire stations and one support facility. Each building is considered critical to the City's ability to provide post-earthquake emergency services.

The evaluations determined each building's expected structural performance for an Immediate Occupancy performance objective. After a seismic event, buildings that meet an Immediate Occupancy performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. This report includes a description of each building, the identified seismic deficiencies, seismic-upgrade concept designs for four of the active stations, and recommendations. All the buildings were found to have seismic deficiencies and do not meet the Immediate Occupancy performance objective.

Concept-level seismic upgrade designs were completed for four of the stations and concept plans are provided describing options for mitigation of seismic deficiencies. Recommendations consist of strengthening and supplementing the existing lateral systems, improving lateral load paths, and improving connections. Additional factors such as operational use, functionality, response times, and historic value should also be considered in the decision-making process for these buildings.

3.2 Fire Station 45

3.2.1 Building Description

Year Built:

1965

Number of Stories:

6,550 SF

Address:

Floor Area:

3725 Trenton

Avenue NE,

Bremerton, WA



Fire Station 45, known as the North Perry Community Fire Station, is a two-story reinforced concrete masonry unit (CMU) structure. In plan, the original 1965 building is rectangular, approximately 74 feet by 70 feet, and has a maximum roof height of approximately 20 feet. A portion of the building on the south side as shown in the record drawings appears to have been previously demolished or not constructed. The building sits on a hillside site that slopes downward from west to east, causing the first story to be partially subgrade. Building construction consists of 2x and 3x roof and floor decking supported by glulam beams and CMU walls. The station houses one engine and one aid vehicle.



Figure 3.2-1. Fire Station 45, Exterior looking Southeast.



Figure 3.2-2. Fire Station 45, Exterior looking Northwest.

Structural System

Table 3.2-1. Structural System Description of Fire Station 45.

Structural System	Description
Roof	The roof system is composed of glulam beams supporting 2-inch wood decking.
Floor	The floor of the first floor and apparatus bay (at the second floor) is slab on grade reinforced with welded wire mesh. Second floor framing consists of glulam beams supporting 3-inch wood decking.
Foundations	The masonry walls are supported by continuous concrete spread footings.
Hose Tower	The hose tower is composed of reinforced masonry walls with a wood-framed roof.
Lateral System	Reinforced masonry shear walls resist lateral forces in both the longitudinal and transverse directions.

3.2.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.2-2. Identified Seismic Deficiencies for Fire Station 45.

Deficiency	Description	
Shear Stress Check	Masonry shear walls throughout the building in the longitudinal and transverse directions are overstressed.	
Reinforcing Steel	Reinforcing steel in walls consists of #6 bars spaced at 48 inches on center in the vertical direction and two #4 bars located in the horizontal bond beams located at the tops of walls and windows. The horizontal reinforcing steel ratio in masonry walls is less than 0.007. Inadequate reinforcing steel in walls results in decreased capacity to resist seismic forces.	
Wall Anchorage	The connections between walls and diaphragms do not have the strength required to resist seismic forces. Separation at the wall can cause partial or total collapse of a structure.	

Wood Ledgers

Wood ledgers are used in the connection between the floors/roofs and the walls of the structure. Wood ledgers are weak in tension perpendicular to grain and can cause separation of the diaphragm and walls that may result in partial or complete collapse of the structure.

Transfer to Shear Walls

The connections between diaphragms and shear walls lack the strength required to develop the shear strength of the diaphragm or walls. This connection must have adequate strength to complete the lateral load path to the foundation.

Foundation Dowels

Doweled wall reinforcement does not have the strength required to resist seismic forces between the structure and foundation. Inadequate foundation connections create gaps in the load path that limit the structure's ability to resist seismic forces.

Proportions

The maximum height-to-thickness ratio of shear walls is exceeded by walls in the hose tower and the north and south walls on the eastern end of the apparatus bay. These slender walls are susceptible to out-of-plane forces and have limited bearing capacity.

Cross Ties

Diaphragm cross ties are not continuous through the diaphragm step. Continuous cross ties are required to develop the out-of-plane forces in walls.

Straight Sheathing

Straight-sheathed diaphragms have aspect ratios exceeding 1-to-1. Straight sheathed diaphragms have less strength and much higher deflections than diagonally sheathed or plywood sheathed diaphragms.

Spans

Diaphragms span more than 12 feet and consist of tongue and groove decking. Straight sheathing is ineffective at resisting large shear demands and deflections that long-span diaphragms are subjected to.

Stiffness of Wall Anchors

Relative movement between walls and diaphragms is expected to exceed 1/8 inch. Such movement before wall anchors engage can cause loss of vertical bearing support of the wall and cross-grain bending in ledgers.

There was no geotechnical report provided for the site in question, causing checklist items involving soil to be marked as "unknown". It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be completed for verification.

3.2.3 Findings and Recommendations

Fire Station 45 does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. Deficiencies include inadequate connection of walls at the roof and foundation,

inadequate roof diaphragm capacity, and insufficient shear walls and shear wall strength, particularly at the apparatus bay doors, where an adequate lateral load path is not present. The masonry hose tower also poses a serious falling hazard that could cause more damage to the building and occupants. Due to the extent of the deficiencies, and because of the type of construction, extensive damage and potential for failure of the LFRS during a design-level earthquake is possible. A structural upgrade concept design was not completed for Fire Station 45. It is recommended that the building be replaced to meet the IO performance objective. Upgrading the existing building is also an option; however, with the combination of deficiencies and the expectancy that the existing building does not address current programming and planning needs, a replacement may better suit the fire district's residents and the fire district.

17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
		х		MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System – Building Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
X				SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
X				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
X				MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			X	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
			Х	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			X	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Very Low Seismicity

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
	x			SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in. ₂ (4.83 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	
	x			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. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)	Vert: #6 at 48" Horiz: (2) #4 in bond beams. Bond beams located at tops of walls and windows and at 7.33 feet above second floor. Some bond beams observed not grouted.

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	х			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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)	
	х			WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)	
	Х			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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)	
	Х			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. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	Although not part of this check, column to foundation connections appear to be lacking at wood columns.

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Stiff Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	
		Х		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.3)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
X				SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: Sec. A.6.2.4)	One-story sloping site.

Low, Moderate, and High Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
Х				REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Tier 2: Sec. 5.5.3.1.5; Commentary: Sec. A.3.2.4.3)	Elevations show reinforcing on all sides.
	х			PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30. (Tier 2: Sec. 5.5.3.1.2; Commentary: Sec. A.3.2.4.4)	Not compliant at hose tower. Not compliant at the north and south walls of the apparatus bay at the eastern ends.

Diaphragms (Stiff or Flexible)

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	
	11	х		OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	.6
		х		PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)	

Station 45

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	

Flexible Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	Х			CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)	
	Х			STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	
	X			SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
		х		DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
		х		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 (12.2 m) and have aspect ratios less than 4-to-1. (Tier 2: Sec. 5.6.3; Commentary: Sec. A.4.3.1)	
X				OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	X			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. (Tier 2: Sec. 5.7.1.2; Commentary: Sec. A.5.1.4)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.



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TECHNICAL MEMORANDUM ABREVIATED PROJECT STORM DRAINAGE ANALYSIS

Project: Central Kitsap Fire & Rescue Station 45, 3725 Trenton Ave

To: Rice Fergus Miller, Attn: Lorie Cook Subject: Stormwater Management System

Date: September 30, 2019 From: Richard Langford

This Technical Memorandum (TM) summarizes the storm drainage analysis and system design feasibility requested by RFM of the proposed improvements of Central Kitsap Fire & Rescue Station 45 located at 3725 Trenton Avenue NE Bremerton. The proposed improvements include the replacement of the existing station house with a new 7,500 sf building, the construction of ~18,000 sf of asphalt and sidewalk and 10,000 sf of landscaping. The proposed site plan will require the removal/demolition of the existing station building, approximately 30,000 sf of asphalt and concrete and the removal or abandonment, or modification of some existing utilities. Also the excavation of approximaly 1,000 cy of material for placement of the pond is required.

The site is evaluated for stormwater mitigation minimum requirements thresholds for Development and Redevelopment per Kitsap County Stormwater Manual (KCSWM) Vol 1, chapter 4 flow charts 4.1 and 4.2. Because the site's location and amount of runoff direct discharge is not applicable minimum requirements 1-9 apply to this project.

The following parameters are the basis for the sizing of the detention systems, water quality mitigation and the storm conveyance systems. Based on the geotechnical report infiltration is not considered feasible, consequently detention is proposed. The WWHM 2012 continuous flow model program with a Quilcene 0.8 rain gauge is used for analysis.

- Total disturbed area is 57,000 sf (1.3 ac).
- Impervious area is 18,000 sf (0.41 ac).
- Building foot print is 7,500 sf (.17 ac).
- Landscaped & pond area is 31,500 sf (0.72ac).

Due to existing topography there are two storm discharge basins on site one to the east and the other to the west. The detention volume needed for flow control requirements is separated into two detention systems.

- The first system is located near the eastern property line and is made up of 100 lf of 5 foot diameter pipe. Discharge from the barrel vault is to the existing conveyance system in Illahee rd to the east of the site. Water treatment via underground concrete vault measuring 6' x 4' using an engineered soil media.
- The second system is located in the western portion of the site and is a detention/wetpond. Live storage measures 69'x 39' with a riser volume of ~0.46 acft. Both dead pool and live storage are 4.0' deep with 3:1 side slopes. Pond access road and fence are also proposed. Discharge from the pond is to a wooded area to the western portion of the site via flow spreader.



Geotechnical Investigation Proposed Fire Station 45

3725 Trenton Avenue NE Bremerton, Washington

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August 13, 2018

1.0 Introduction

In accordance with your authorization, Cobalt Geosciences, LLC (Cobalt) has completed a geotechnical investigation for the proposed Fire Station 45 located at 3725 Trenton Avenue in Bremerton, Washington (Figure 1).

The purpose of the geotechnical investigation was to identify subsurface conditions and to provide geotechnical recommendations for foundation design, stormwater management, earthwork, soil compaction, and suitability of the on-site soils for use as fill.

The scope of work for the geotechnical evaluation consisted of a site investigation followed by engineering analyses to prepare this report. Recommendations presented herein pertain to various geotechnical aspects of the proposed development, including foundation support of the new building and pavement design.

2.0 Project Description

The project includes construction of a new fire station, concrete access apron, and associated utilities, stormwater infrastructure, landscaped regions, and parking areas.

We have reviewed a preliminary site plan showing the location of the new fire station just south of the existing fire station. We understand that a future land exchange with the property owner to the south may allow the new station to be constructed in this area.

Anticipated building loads are expected to be moderate and site grading will include cuts and fills on the order of 6 feet or less. We expect that the former (existing) station will be demolished and that employee parking may be located north of the new station, on the current parcel.

3.0 Site Description

The site is located at 3725 Trenton Avenue in Bremerton, Washington (Figure 1). The property consists of one rectangular shaped parcel (No. 01240140132003) with a total area of 2.42 acres.

The eastern one-third of the property is developed with Fire Station 45. The station is surrounded by asphalt and concrete pavements which extend downward to a west-facing daylight level of the building. There are local rockery walls up to 6 feet in height south of the building. A septic system is situated west of the western parking lot. A cellular tower is located south of the septic system.

The site slopes gently downward toward the west at magnitudes of less than 15 percent and topographic relief of about 30 feet. The western two-thirds of the property is undeveloped and vegetated with grasses, bushes/shrubs, blackberry vines, Salal, and ferns, along with Fir Maple, Cedar, and Madrone trees.

The site is bordered to the north, south, and west by residential properties and to the east by Trenton Avenue.



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4.0 Field Investigation

4.1.1 Site Investigation Program

The geotechnical field investigation program was completed on July 27, 2018 and included excavating and sampling three test pits within the property for subsurface analysis. We were not able to excavate test pits in the area of the proposed fire station; however, the soil conditions in areas underlain by glacial till are typically very consistent across short distances.

The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

A Cobalt Geosciences field representative conducted the explorations, collected disturbed soil samples, classified the encountered soils, kept a detailed log of the explorations, and observed and recorded pertinent site features.

The results of the sampling are presented on the test pit logs enclosed in Appendix C.

5.0 Soil and Groundwater Conditions

5.1.1 Area Geology

The site lies within the Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and non-glacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses.

The Geologic Map of Washington – Northwest Quadrant, indicates that the site is underlain by Vashon Glacial Till.

Vashon Glacial Till is typically characterized by an unsorted, non-stratified mixture of clay, silt, sand, gravel, cobbles and boulders in variable quantities. These materials are typically dense and relatively impermeable. The poor sorting reflects the mixing of the materials as these sediments were overridden and incorporated by the glacial ice.

Test Pit Explorations

All of the test pits encountered an approximate 12-inch-thick layer of topsoil and vegetation underlain by approximately 2 to 2.5 feet of loose to medium dense, silty-fine to medium grained sand with gravel (Weathered Glacial Till). These materials were underlain by dense to very dense, silty-fine to medium grained sand with gravel (Glacial Till), which continued to the termination depths of the test pits.

The soil conditions in this part of Bremerton are relatively consistent. We anticipate that the soil conditions south of the existing building (on the adjacent parcel), will be very similar to those encountered in our test pits.



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5.1.2 Groundwater

Groundwater was not encountered in any of the test pits. Based on our observations, we do not anticipate that large volumes of groundwater will be encountered at the site. There is a slight chance that perched groundwater may develop between finer grained deposits or between loose and denser soil materials at depth.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project.

6.0 Geologic Hazards

6.1 Erosion Hazard

The <u>Natural Resources Conservation Services</u> (NRCS) maps for Kitsap County indicate that the site is underlain by Alderwood gravelly sandy loam (0 to 8 percent slopes) and Ragnar fine sandy loam (6 to 15 percent slopes). These soils have a slight to moderate erosion potential in a disturbed state.

It is our opinion that soil erosion potential at this project site can be reduced through landscaping and surface water runoff control. Typically erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches and diversion trenches. The typical wet weather season, with regard to site grading, is from October 31st to April 1st. Erosion control measures should be in place before the onset of wet weather.

6.2 Seismic Hazard

The overall subsurface profile corresponds to a Site Class D as defined by Table 1613.5.2 of the 2015 International Building Code (2015 IBC). A Site Class D applies to an overall profile consisting of dense to very dense soils within the upper 100 feet.

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S , S_I , F_a , and F_v . The USGS website includes the most updated published data on seismic conditions. The site specific seismic design parameters and adjusted maximum spectral response acceleration parameters are as follows:

PGA (Peak Ground Acceleration, in perce	
S_S	152.70% of g
S_1	60.30% of g
F_A	1.00
F_V	1.50



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Additional seismic considerations include liquefaction potential and amplification of ground motions by soft/loose soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The relatively dense soil deposits that underlie the site have a low liquefaction potential.

7.0 DISCUSSION

7.1.1 General

The site is underlain by weathered glacial till, which overlie dense to very dense cemented glacial till. The proposed fire station and any ancillary structures may be supported on shallow foundation systems bearing on medium dense or firmer native soils and structural fill placed on suitable native soils. In general, bearing soils were observed between 2 and 3.5 feet below existing site elevations.

The underlying soils consist of glacial till which is nearly impermeable. While limited permeable pavements for flow control may be utilized, we do not recommend utilizing widespread infiltration devices at this site.

8.0 Recommendations

8.1.1 Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil and fill. Based on observations from the site investigation program, it is anticipated that the stripping depth will be 6 to 18 inches. Deeper excavations will be necessary below large trees and in any areas underlain by undocumented fill materials.

The native soils consist of silty-sand with gravel. These soils may be used as structural fill provided they achieve compaction requirements and are within 3 percent of the optimum moisture. These soils are typically only suitable for use as fill during the summer months, as they will be above the optimum moisture levels in their current state. These soils are variably moisture sensitive and may degrade during periods of wet weather and under equipment traffic.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

8.1.2 Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 8 feet or less for foundation and utility placement. Deeper excavations may be required for certain utilities and detention vaults (if proposed). Excavations should be sloped no steeper than 1H:1V (Horizontal:Vertical) in medium dense native soils and 3/4H:1V in dense to very dense native soils. If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 1.5H:1V, where room permits.

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Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

Soil conditions may not be completely known from the geotechnical investigation. In the case of temporary cuts, the existing soil conditions may not be completely revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of temporary slopes will need to be re-evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed and required deadlines can be met.

If any variations or undesirable conditions are encountered during construction, we should be notified so that supplemental recommendations can be made. If room constraints or groundwater conditions do not permit temporary slopes to be cut to the maximum angles allowed by the WAC, temporary shoring systems may be required. The contractor should be responsible for developing temporary shoring systems, if needed. We recommend that Cobalt Geosciences and the project structural engineer review temporary shoring designs prior to installation, to verify the suitability of the proposed systems.

8.1.3 Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the
 site soils, to take place during the dry season (generally May through September). However, provided
 precautions are taken using Best Management Practices (BMP's), grading activities can be completed
 during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility
 of sediment entering the surface water. This may include additional silt fences, silt fences with a
 higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.



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8.1.4 Foundation Design

The proposed single-family residence may be supported on a shallow spread footing foundation system bearing on undisturbed medium dense or firmer native soils or on properly compacted structural fill placed on the suitable native soils. If structural fill is used to support foundations, then the zone of structural fill should extend beyond the faces of the footing a lateral distance at least equal to the thickness of the structural fill. Loose soils may be present up to 3.5 feet below existing grades. Some overexcavation and/or recompaction may be required depending on the location and proposed depth of the new foundation systems.

For shallow foundation support, we recommend widths of at least 18 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 4,000 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings, should be less than ½ inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.40 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 275 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas).

The allowable friction factor and allowable equivalent fluid passive pressure values include a factor of safety of 1.5. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A 1/3 increase in the above values may be used for short duration transient loads.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.



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8.1.5 Stormwater Management

The site is underlain by Vashon Glacial Till which is nearly impermeable in its unweathered state. Perched groundwater (as interflow) commonly occurs between weathered and unweathered glacial till during the late winter and early spring months. This groundwater often ranges from 3 to 8 feet below existing elevations in areas underlain by till.

We performed an in-situ infiltration test pit in TP-1 at a depth of 4 feet below grade. The unfactored measured infiltration rate was 0.15 inches per hour. This is below what the Washington State Department of Ecology considers feasible for infiltration. Infiltration is not recommended at this site.

Due to the subsurface soil, and likely seasonal groundwater conditions, widespread infiltration of stormwater runoff is not recommended. We recommend utilizing detention systems and possibly dispersion systems if there is adequate space. Localized permeable pavements may be considered in light duty parking areas provided they are located in areas with less than 2 feet of proposed cut. An infiltration rate of 0.25 inches per hour may be used for permeable pavements within the upper 2 feet of the existing ground surfaces. We can provide additional recommendations upon request.

8.1.6 Slab-on-Grade

We recommend that the upper 12 inches of the existing native soils within slab areas be re-compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method). All loose soils, if encountered, should be removed to a depth at least 2 feet below slab areas prior to slab-on-grade preparation.

Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 200 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined in Section 8.1.

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4 inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from the building and preferably with a relatively impermeable surface cover immediately adjacent to the building.



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8.1.7 Groundwater Influence on Construction

Groundwater was not encountered in the test pits. There is a chance that perched groundwater will be encountered during winter months at the site. We anticipate that perched groundwater would be encountered between 3 and 8 feet below grade during late winter and early spring months.

If groundwater is encountered, we anticipate that sump excavations and small diameter pumps systems will adequately de-water short-term excavations, if required. Any system should be designed by the contractor. We can provide additional recommendations upon request.

8.1.8 Utilities

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The contractor is responsible for the safety of open trenches. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

In general, silty and sandy soils were encountered at shallow depths in the explorations at this site. These soils have low cohesion and density and will have a tendency to cave or slough in excavations. Shoring or sloping back trench sidewalls is required within these soils in excavations greater than 4 feet deep.

All utility trench backfill should consist of imported structural fill or suitable on site soils. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. Depending on the depth and location of the proposed utilities, we anticipate the need to re-compact existing fill soils below the utility structures and pipes. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction procedures.

8.1.9 Pavement Recommendations

The near surface subgrade soils generally consist of silty sand with gravel. These soils are rated as good for pavement subgrade material (depending on silt content and moisture conditions). We estimate that the subgrade will have a California Bearing Ratio (CBR) value of 10 and a modulus of subgrade reaction value of k = 200 pci, provided the subgrade is prepared in general accordance with our recommendations.

We recommend that, at a minimum, 12 inches of the existing subgrade material be moisture conditioned (as necessary) and re-compacted to prepare for the construction of pavement sections. Deeper levels of recompaction or overexcavation and replacement may be necessary in areas where fill and/or loose soils are present.



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The subgrade should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. In place density tests should be performed to verify proper moisture content and adequate compaction.

The recommended flexible and rigid pavement sections are based on design CBR and modulus of subgrade reaction (k) values that are achieved, only following proper subgrade preparation. It should be noted that subgrade soils that have relatively high silt contents will likely be highly sensitive to moisture conditions. The subgrade strength and performance characteristics of a silty subgrade material may be dramatically reduced if this material becomes wet.

Based on our knowledge of the proposed project, we expect the traffic to range from light duty (passenger automobiles) to heavy duty (fire trucks). The following tables show the recommended pavement sections for light duty and heavy duty use.

ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT

LIGHT DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **	
2.5 in.	6.0 in.	12.0 in.	

HEAVY DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **	
5.0 in.	6.0 in.	12.0 in.	

PORTLAND CEMENT CONCRETE (RIGID) PAVEMENT

Min. PCC Depth	Aggregate Base*	Compacted Subgrade*
6.0 in.	6.0 in.	12.0 in.

^{* 95%} compaction based on ASTM Test Method D1557

**A proof roll may be performed in lieu of in place density tests

The asphaltic concrete depth in the flexible pavement tables should be a surface course type asphalt, such as Washington Department of Transportation (WSDOT) ½ inch HMA. The rigid pavement design is based on a Portland Cement Concrete (PCC) mix that has a 28 day compressive strength of 4,000 pounds per square inch (psi). The design is also based on a concrete flexural strength or modulus of rupture of 550 psi.



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9.0 Construction Field Reviews

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Observe bearing capacity at foundation locations
- Observe slab-on-grade preparation
- Observe excavation stability

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

10.0 Closure

This report was prepared for the exclusive use of Rice Fergus Miller and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes, and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of Rice Fergus Miller who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.



August 13, 2018

Respectfully submitted,

Cobalt Geosciences, LLC

Original signed by:



Exp. 6/26/20 Phil Haberman, PE, LG, LEG Principal PH/sc

APPENDIX AStatement of General Conditions

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

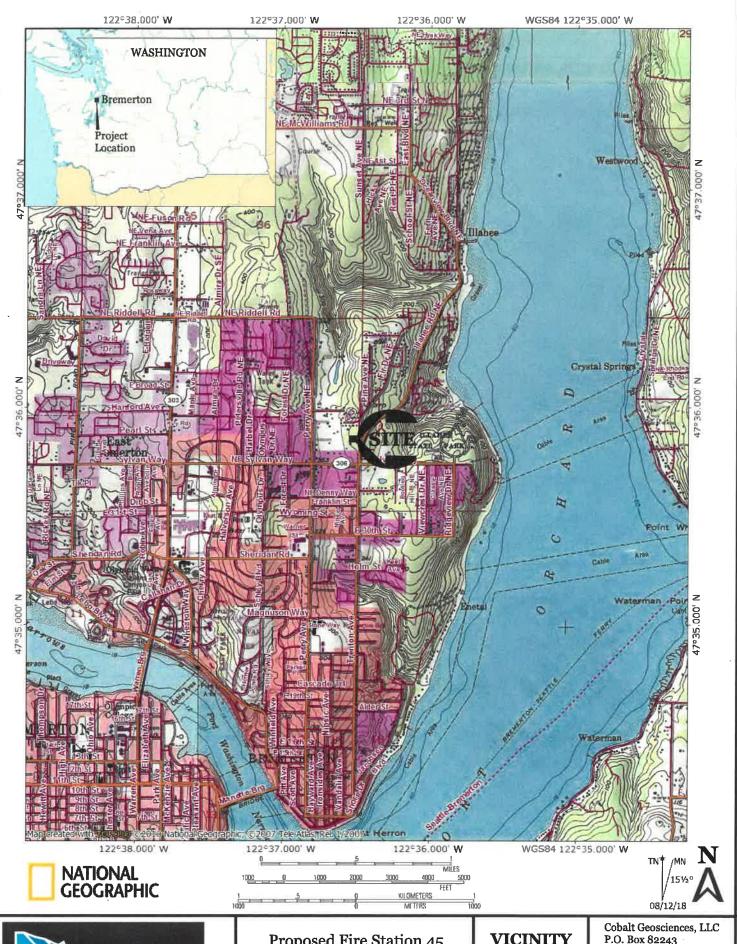
INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

APPENDIX B

Figures: Vicinity Map, Site Plan





Proposed Fire Station 45 3725 Trenton Avenue Bremerton, Washington VICINITY MAP FIGURE 1 Cobalt Geosciences, LLC P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 www.cobalteen.com

www.cobaltgeo.com cobaltgeo@gmail.com



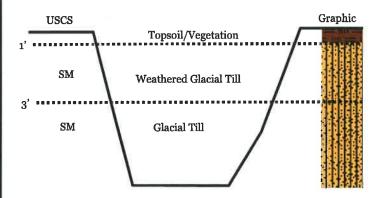
TP-1 Approximate
Test Pit
Location





APPENDIX C Test Pit Logs

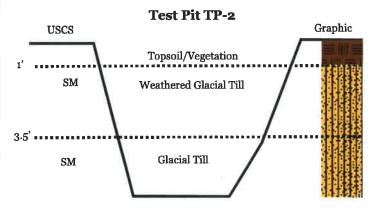
Test Pit TP-1



- 0-1' Vegetation/Topsoil
- 1-3' Silty Sand with Gravel (SM)
 Loose to medium dense, silty-fine to medium grained sand with gravel, mottled yellowish brown to grayish brown, moist.
 (Weathered Glacial Till)
- 3-10' Silty Sand with Gravel (SM)

 Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

End of Test Pit 10' No Groundwater No Caving

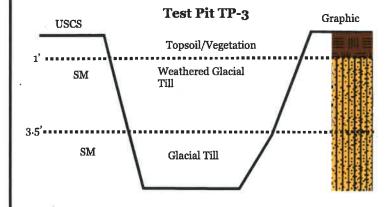


0-1' Vegetation/Topsoil

- 1-3.5' Silty Sand with Gravel (SM)
 Loose to medium dense, silty-fine to medium grained sand with gravel, mottled yellowish brown to grayish brown, moist.
 (Weathered Glacial Till)
- 3.5-9' Silty Sand with Gravel (SM)

 Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

End of Test Pit 9' No Groundwater No Caving

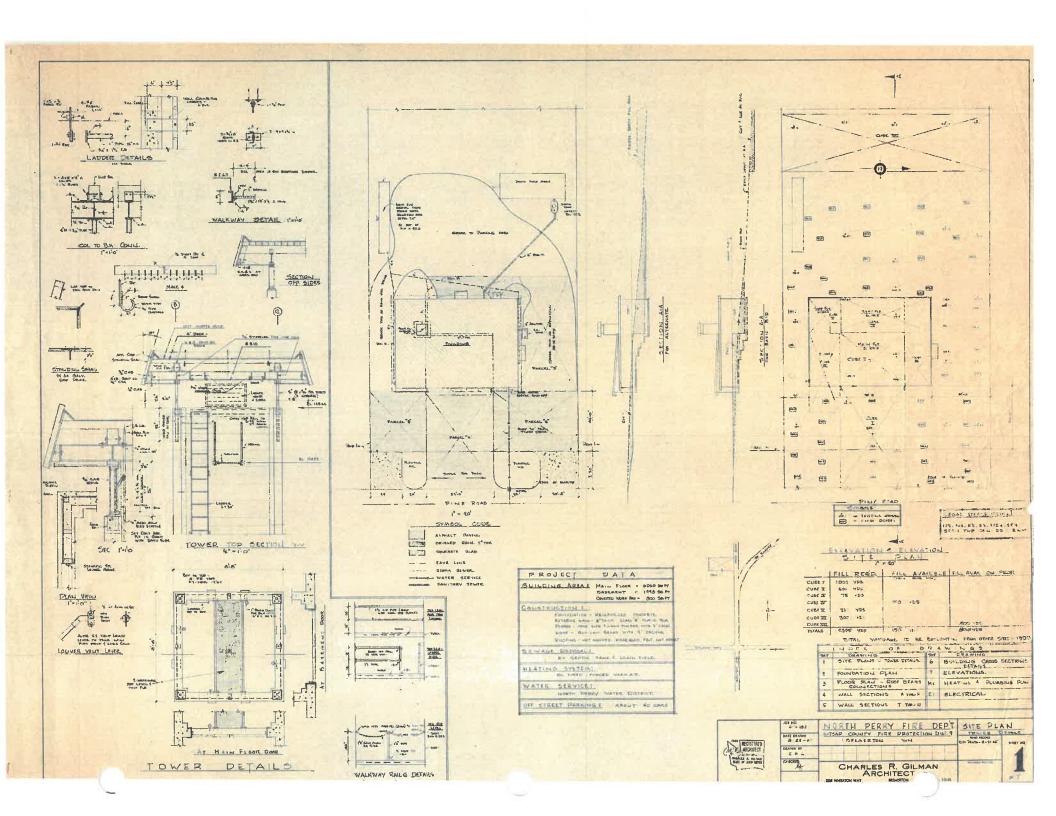


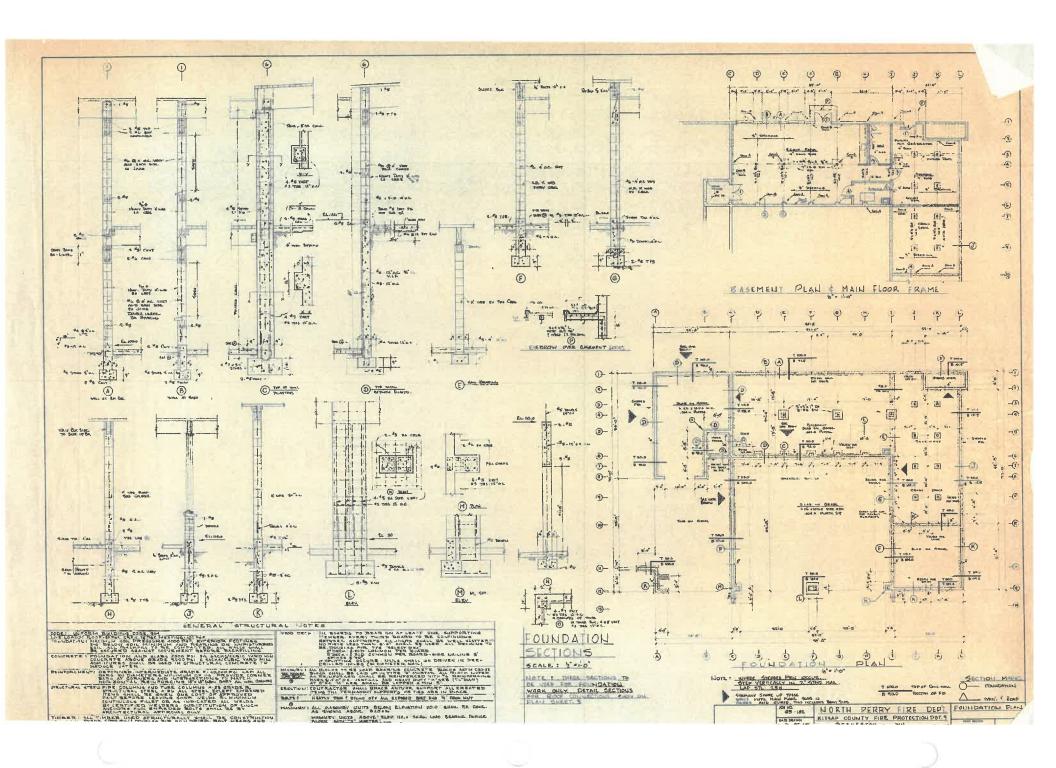
- 0-1' Vegetation/Topsoil
- 1-3.5' Silty Sand with Gravel (SM)
 Loose to medium dense, silty-fine to medium grained sand with gravel, mottled yellowish brown to grayish brown, moist.
 (Weathered Glacial Till)
- 3.5-7' Silty Sand with Gravel (SM)

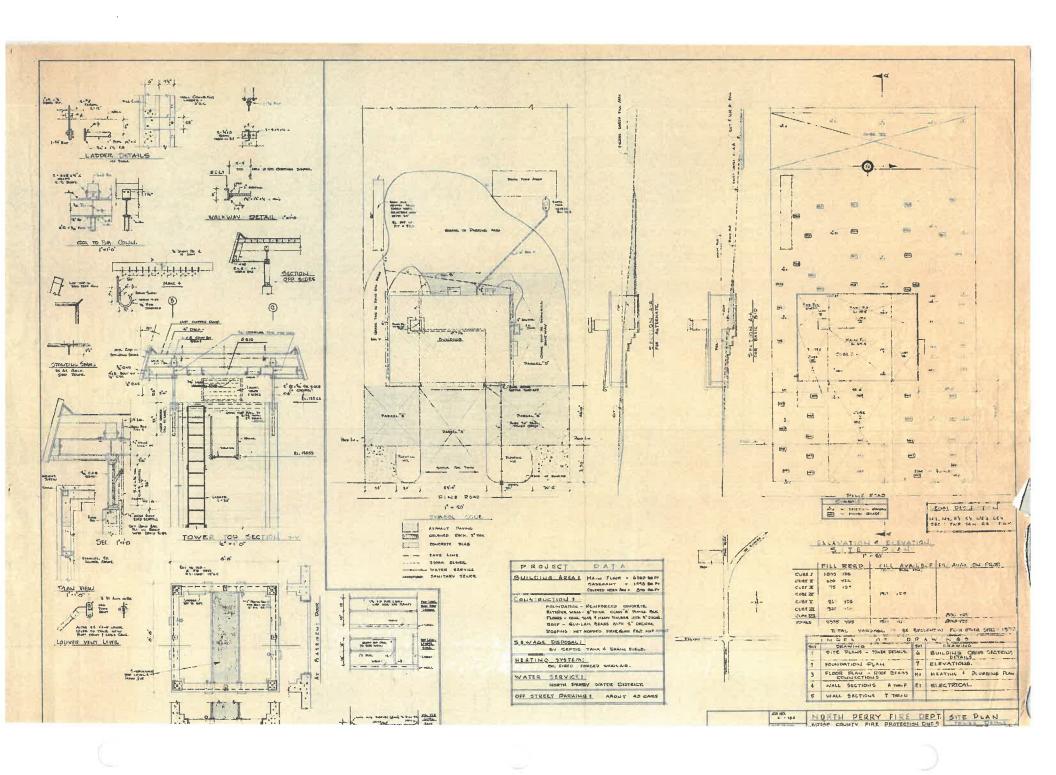
 Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

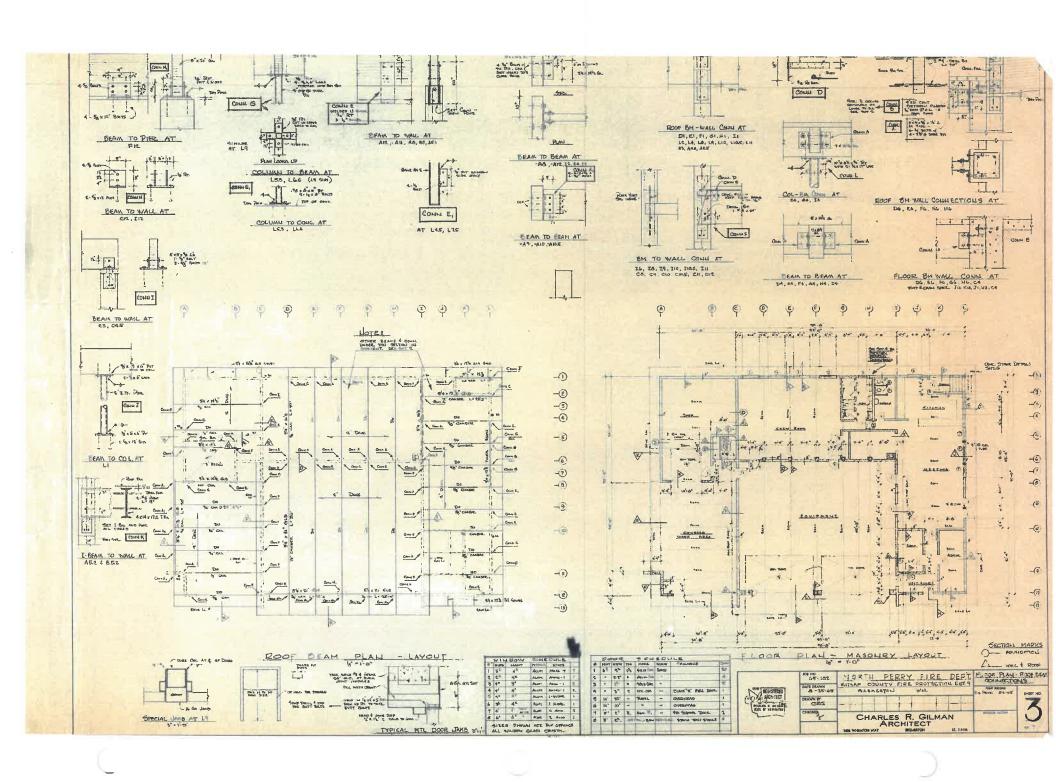
End of Test Pit 7' No Groundwater No Caving

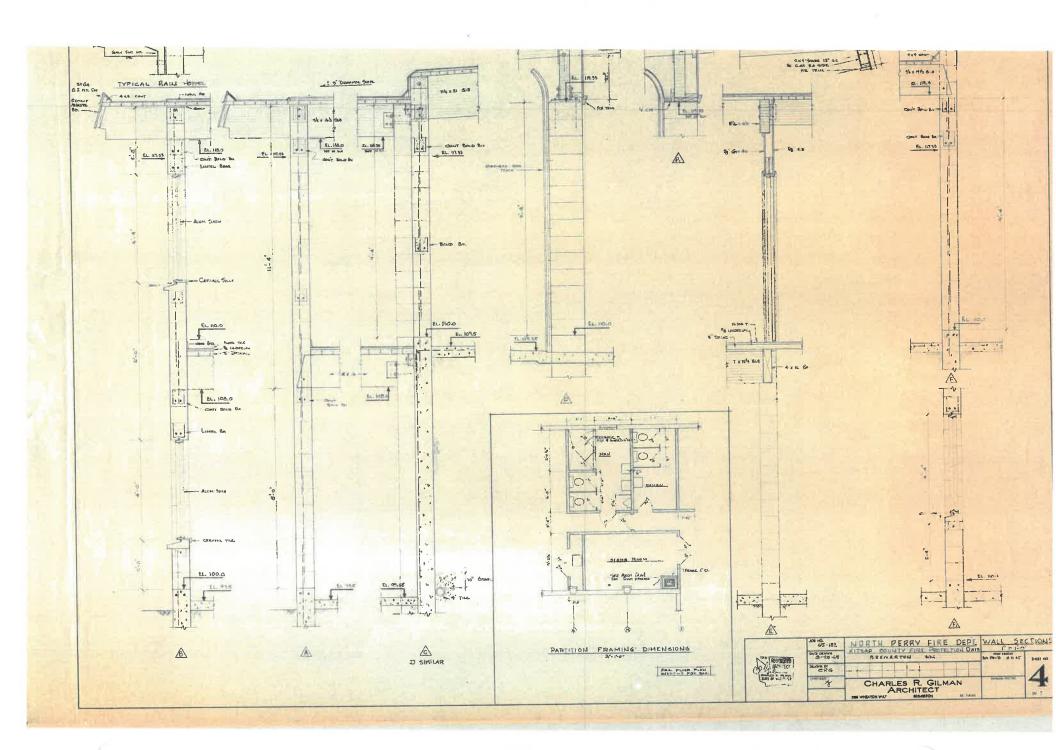


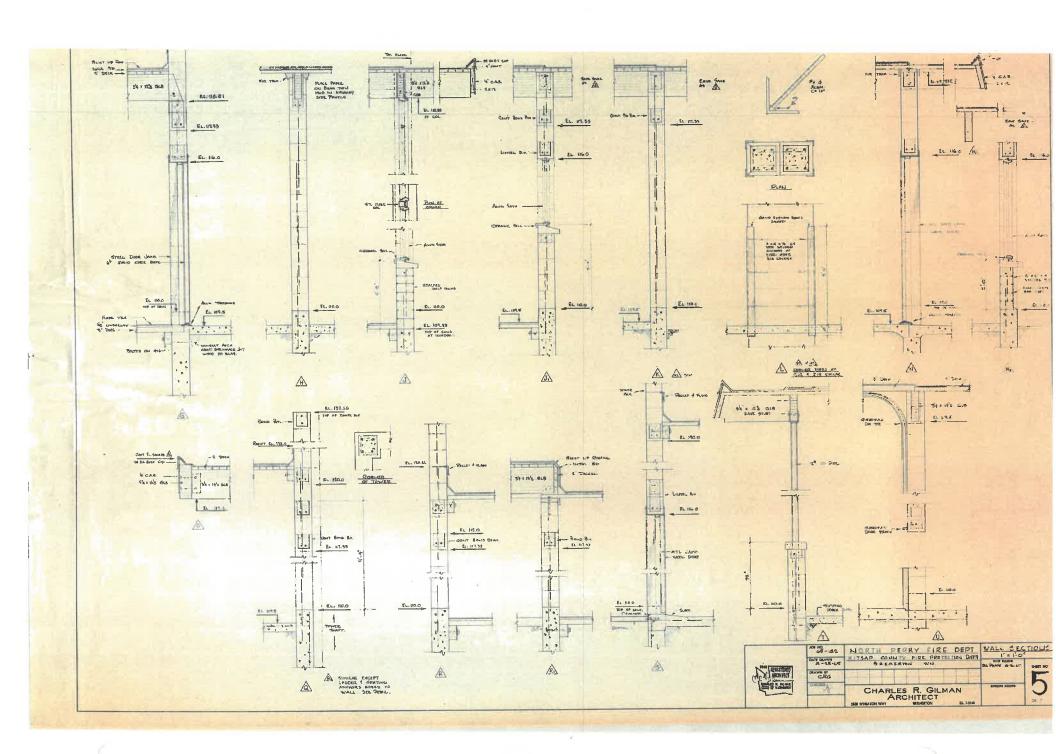


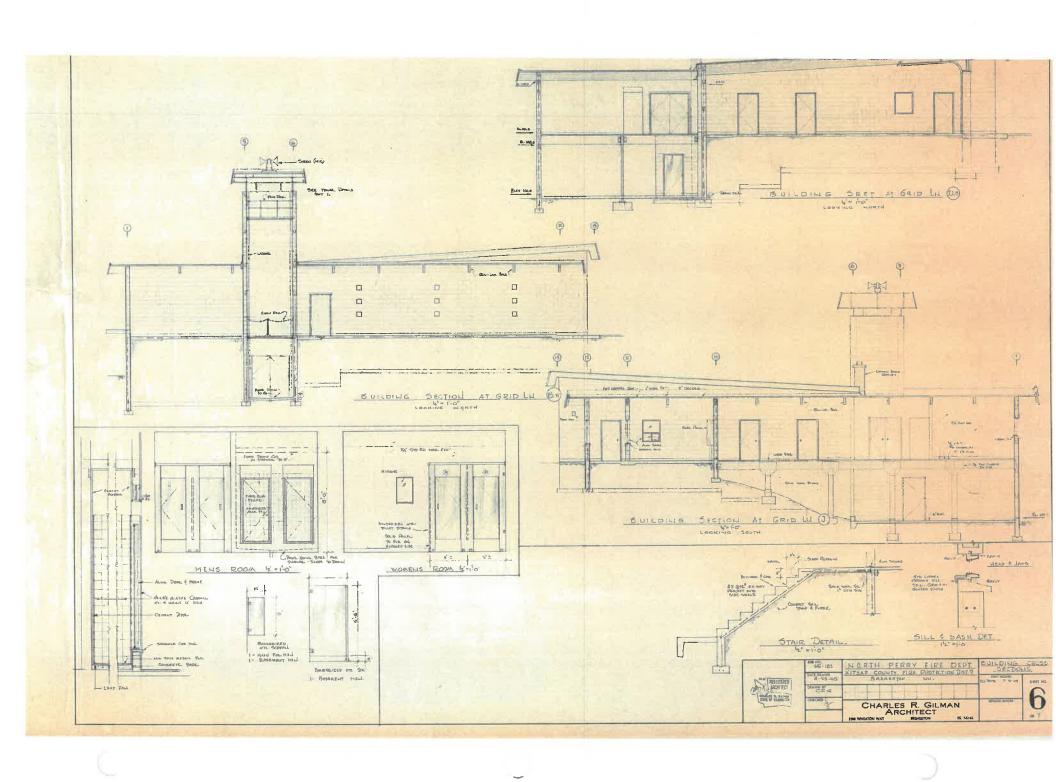


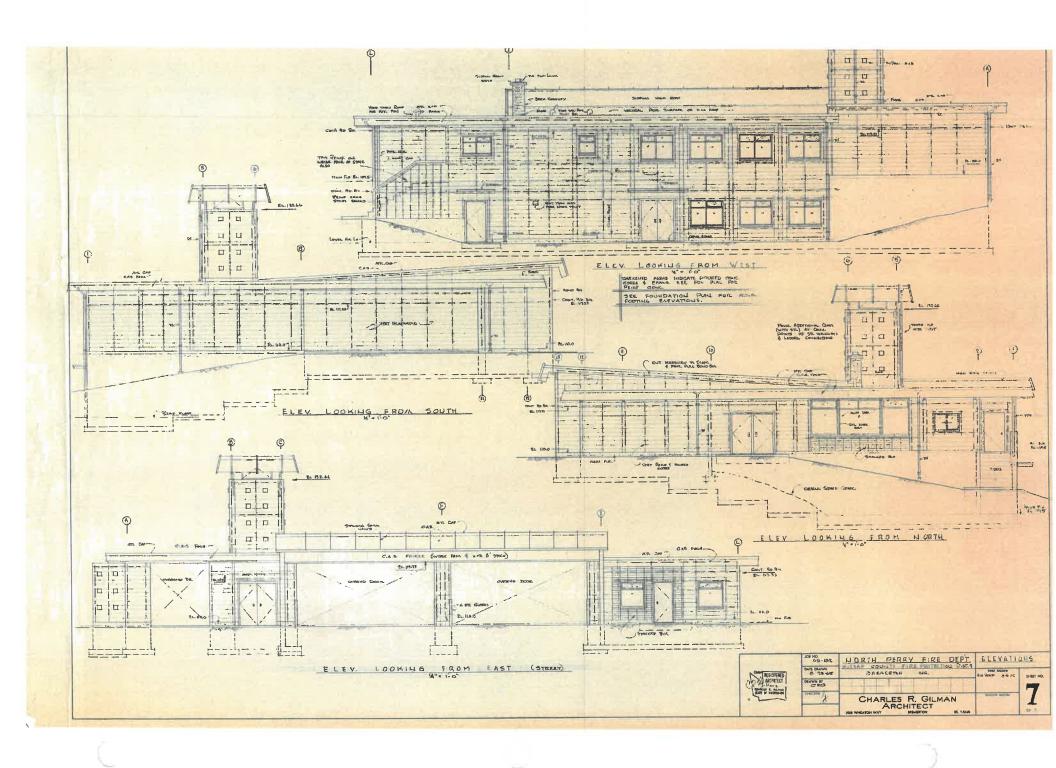












Fire Station 51 - Silverdale

Built in 1979, Fire Station 51 is 11,791 square feet in size. The station includes living quarters for 11 firefighters, four drive-through apparatus bays, firefighter work areas, office space, a fitness room, and apparatus support spaces. Behind the station is a vehicle fueling facility, a large parking area, and a 2,400 square foot Service Building.

Fire Station 51's property is 2.28 acres in size. It fronts Silverdale Way and is excellently located to serve the commercial areas of Silverdale and surrounding neighborhoods.



Fire Station 51 – Silverdale 10955 Silverdale Way NW, Silverdale, WA 98383

The large apparatus bay currently accommodates two fire engines, two medic units, a ladder truck, rescue boat, and a battalion chief' command vehicle.

Prior to the construction of the district's administrative building on Newberry Hill Road, this station was the Headquarters for Fire District 1. As such, its internal layout and organization was designed for an administrative function that no longer exists. Substantial increase in call volume for this station has forced former office spaces to be used for other purposes, resulting in inefficiency. Adding to these inefficiencies is an overall lack of adequate space for cleaning and decontaminating equipment, proper storing of bunker gear, or private sleep room and restrooms to accommodate the increased number of female firefighters over the past 30 years. Additionally, the structural capacity of the fire station in the event of a design-level earthquake is of significant concern.

Observed Deficiencies

- High energy costs due to minimal insulation and low performing windows not in compliance with current energy codes
- Apparatus bays are narrower than today's standard and do not have the dimensional vehicle clearances required by WAC 296-305, Safety Standards for Fire Fighters
- Low level of building security exterior doors, visibility of entrances, parking areas
- Disproportionate number of restrooms and showers in relation to increased number of female firefighters
- Group restroom and showers do not comply with today's standard for private facilities
- Station is at risk of being unsafe to occupy after a design-level earthquake
- Maintenance Building is at risk of being unsafe to occupy after a design-level earthquake





Proposed Improvements

The recommended approach is to replace Fire Station 51 on its current site. This would entail demolishing the existing station and relocating the station's crews for 12 to 15 months during construction.

The new Fire Station 51 will include living quarters for 10 firefighters, four apparatus bays, each at 80' deep, work areas, and a small public lobby. The replacement fire station has been preliminarily programmed at approximately 17,500 square feet.

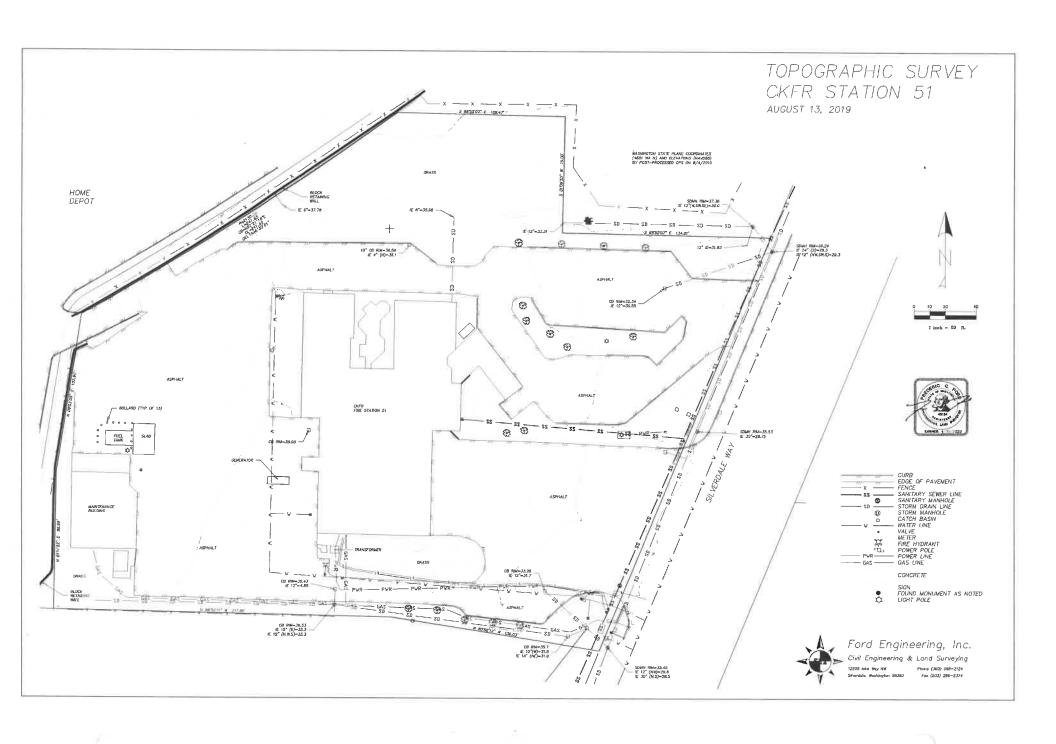
The estimated construction cost for replacing this fire station would be \$10,726,318.00 in 2019 dollars. This amount does not include project expenses, nor inflation, which will be dependent on the construction start date.

End of Fire Station 51 - Silverdale





		Fire Station	
		51	
Operations			7,840
Apparatus Bay (4 stacking bays)	80' x 80'	6,400	
Decon	10' x 15'	150	
Shop	12' x 10'	120	
Clean Project Room	16' x 12'6"	200	
App Bay Restroom	8' x 12'	96	
Bunker Gear Storage	20' x 30'	600	
General Storage	10' x 15'	150	
App Bay Janitorial	8' x 8'	64	
Sprinkler Riser / Compressor	6' x 10'	60	
Living Quarters	-		4,736
(12) Sleep Rooms	(12) 9' x 15'	1,620	
(2) Restroom/Showers	_ (6) 8' x 12'	576	
Kitchen	_ 18' x 24'	432	
Dining for 6	14' x 30'	420	
Dayroom for 4	28' x 28'	784	
Fitness	30' x 24'	720	
Laundry	10' x 12'	120	
Janitorial	8' x 8'	64	
Public and Front of the House			1,424
Public Lobby	8' x 12'	96	-,
(2) Public Unisex Restroom	(2) 8' x 8'	128	
Conference Room (16 people)	20' x 30'	600	
Firefighter Work Area (Watch Office)	18' x 20'	360	
(2) Private Offices	(2) 12' x 10'	240	
· ·			
Subtotal			14,000
Mechanical / Electrical	10%		1,400
Circulation	15%	_	2,100
Total Anticipated Square Footage			17,500

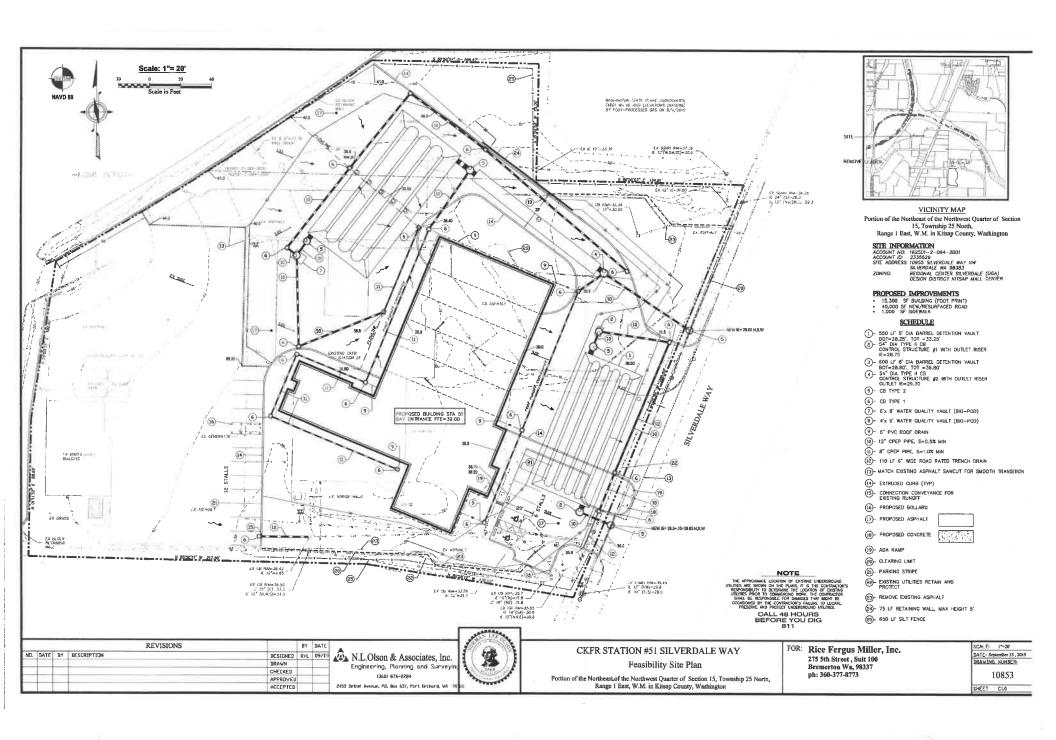


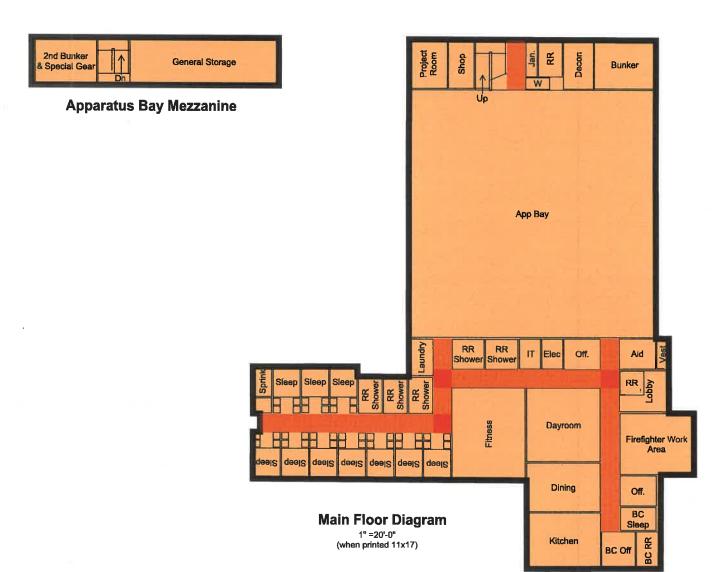












Program Requirements

Oper	ations			
	Apparatus Bay	80"x80"	6,400	
	Decon	10'x15'	150	
	Shop	12'x10'	120	
	Clean Project Room	16'x12.5'	200	
	App Bay Restroom	8'x12'	96	
	Bunker Gear Storage	.60 x 10sf ea.	600	
	General Storage		150	
	App Bay Janitorial	6'x12'	72	
	Wash Alcove	2'x8'	16	
	Sprinkler Riser Rm	6'x6'	36	
				7,840
Living	Quarters			
	(10) Sleep Rooms	(10) 9'x15'	1,350	
	(5) Restroom/Showers	(5) 8'x12'	480	
	Kitchen	18'x24'	432	
	Dining for 10	16'x24'	384	
	Dayroom for 6	24'x24'	576	
	Fitness	30'x24'	720	
	Laundry	10'x12'	120	
	Janitorial	8"x8"	64	
				4,126
Publi	c / Front of the House			
	Vestibule	4'x8'	32	
	Lobby	8'x12'	96	
	(1) Unisex Restroom	8'x8'	64	
	First Aid Room	10'x12'	120	
	Firefighter Work Area	20'x24'	480	
	(2) Private Offices	(2) 10'x12'	240	
	BC Office	10'x12'	120	
	BC Sleep Room	9'x15'	135	
	BC Restroom/Shower	8'x12'	96	
				1,383
		Subtotal		13,349
	Mechancial / Electrical / IT	10%		1,335
	Circulation	15%		2,002
		Total		16,686







STATION 51



STATION 51



Central Kitsap Fire and Rescue Bond Study 10/2/2019

Station 51-Silverdale

New Station Building \$ 7,834,805 Site Work Station 51 \$ 1,843,282 Total direct Today's Dollars \$ 9,678,087

Exclusions:

Escalation
State Sales Tax
Construction Contingency
Architect/Engineering Fees
Permits

Toxic Soils/Materials Removal Construction Management Fees Utility Infrastructure to Site Piling/Special Foundations Wetland Mitigation Jurisdictional/Utility Co. Fees Owner's Consultant Costs Equipment & Furnishings Not Listed
Off Site Work
Builders Risk Insurance
Moving/Relocation Expense
Alternative Delivery-GC/CM, Design-Build
Legal Expense
Land Purchase/Financing Costs
Fire Vehicles/Apparatus/Radio Towers

Project/Bid Market/Code Change Contingency



Station 51 Summary

Station 51 Area: 17,500 SF Rates Current At September 2019

Desc	ription		Cost/SF	Total Cost
140	From letters		#00.00	6405 504
A10	Foundations		\$28.32	\$495,531
B10	Superstructure		\$37.90	\$663,296
B20	Exterior Enclosure		\$61.87	\$1,082,729
B30	Roofing		\$29.91	\$523,339
C10	Interior Construction		\$26.16	\$457,777
C20	Stairs		\$1.43	\$25,000
C30	Interior Finishes		\$23.98	\$419,576
D20	Plumbing		\$34.00	\$595,000
D30	HVAC		\$43.00	\$752,500
D40	Fire Protection		\$6.80	\$119,000
D50	Electrical		\$43.50	\$761,250
E10	Equipment		\$4.88	\$85,370
E20	Furnishings		\$13.49	\$236,025
Z10	General Conditions		\$34.00	\$595,000
		ESTIMATED NET COST	\$389.22	\$6,811,393
MAR	GINS & ADJUSTMENTS			
Desig	gn Contingency-Building	7.0 %		\$476,797
Conti	actors Overhead & Profit	7.5 %		\$546,615
		ESTIMATED TOTAL COST	\$447.70	\$7,834,805

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Station 51 Detail

Station 51 Area: 17,500 SF Rates Current At September 2019

Descrip	otion	Unit	Qty	Rate	Total Cost
A1010	Standard Foundations				
1	Standard foundation excavation,backfill,haul off	SF	17,500	1.50	26,250
2	Footing drains w/gravel	LF	627	20.00	12,540
3	Add for lateral system footings	EA	12	2,500.00	30,000
4	Continuous footings at exterior	CY	46	550.00	25,135
5	Continuous footings interior	CY	12	550.00	6,820
6	Column footing allowance	CY	69	460.00	31,556
8	Stem walls	SF	2,507	46.00	115,322
9	Waterproofing foundation	SF	2,759	5.85	16,140
	Standard Foundations			\$15.07/SF	\$263,763
A1030	Slab on Grade				
10	Gravel at slab on grade	SF	17,500	0.70	12,250
11	Trench drains @ App bay	LF	280	185.00	51,800
12	8" slab on grade-App Bay	SF	6,400	8.50	54,400
13	4" slab on grade-balance of bldg.	SF	11,100	6.35	70,485
14	Rebar at 8" slab-#5 @ 14" O.C.	Lb	13,165	1.70	22,381
15	Slab depressions, block-outs and columns closures	SF	17,500	0.40	7,000
16	Rigid insulation @ slab perimeter	SF	1,568	3.00	4,702
17	Vapor retarder @ slab	SF	17,500	0.50	8,750
	Slab on Grade			\$13.24/SF	\$231,768
B1010	Floor Construction				
330	Mezzanine floor framing	SF	1,280	18.00	23,040
	Floor Construction			\$1.32/SF	\$23,040
B1020	Roof Construction				
20	Gang nail truss, TJI, plywood roof structure	SF	20,008	32.00	640,256
	Roof Construction			\$36.59/SF	\$640,256
B2010	Exterior Walls				
27	Ext wall frame @ openings, glazing areas	SF	5,257	8.00	42,056
28	Exterior wall framing system-insul,sheath,gwb,wrb,clips	SF	7,299	30.35	221,524
29	Misc. flash,trim,seal,caulk exterior wall envelope and screens	SF	12,556	2.65	33,273
30	Red Fiber Cement Siding	SF	2,824	24.00	67,776
31	Wood siding	SF	2,825	24.00	67,800
32	Precast-base perimeter & public entry	SF	1,650	52.00	85,800
279	Ext. signage	LS	1	25,000.00	25,000
	Exterior Walls			\$31.04/SF	\$543,229

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Station 51 Detail

Station 51 Area: 17,500 SF Rates Current At September 2019

Descrip	otion	Unit	Qty	Rate	Total Cost
B2020	Exterior Windows				
35	Ext. glazing systems	SF	3,500	75.00	262,500
	Exterior Windows			\$15.00/SF	\$262,500
B2030	Exterior Doors				
36	High speed overhead sectional doors	EΑ	8	30,000.00	240,000
39	Exterior doors/frames/hardware-per leaf	EΑ	9	3,000.00	27,000
40	Misc. exterior door hardware/card/electric	LS	1	10,000.00	10,000
	Exterior Doors			\$15.83/SF	\$277,000
B3010	Roof Coverings				
44	Membrane roofing system	SF	20,008	18.35	367,146
45	Roofing rough carpentry	SF	20,008	0.65	13,005
46	Roof flashing,coping,sheet metal,	SF	20,008	2.05	41,016
47	Fall protection system	SF	20,008	1.00	20,008
48	Misc roofing accessories, hatch, walkpads, ladders	SF	20,008	0.55	11,004
49	Cladding/work at overhangs	SF	2,508	20.00	50,160
264	Metal caps at roof beams	EA	120	175.00	21,000
	Roof Coverings			\$29.91/SF	\$523,339
C1010	Partitions				
50	Interior partitions	SF	20,073	13.55	271,986
52	Add for interior partition types,ratings	SF	13,047	3.50	45,666
331	Transaction window and int. relite allowance	LS	1	7,500.00	7,500
	Partitions			\$18.58/SF	\$325,152
C1020	Interior Doors				
55	Int. HM door/frame/hdwre-per leaf	EΑ	43	2,000.00	86,000
57	Misc. door hardware/ratings/readers	LS	1	5,500.00	5,500
	Interior Doors			\$5.23/SF	\$91,500
C1030	Specialties				
58	Specialties allowance	SF	17,500	2.35	41,125
	Specialties			\$2.35/SF	\$41,125
C2010	Stair Construction				
274	Stair/rails to mezzanine	LS	1	25,000.00	25,000
	Stair Construction			\$1.43/SF	\$25,000
C3010	Wall Finishes				
60	Interior Painting/sealing	SF	17,500	3.55	62,125

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Station 51 Detail

Station 51 Area: 17,500 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
61	Wall protection at apparatus bay walls 8'	SF	1,664	12.00	19,968
62	Ceramic tile wall restrooms/showers	SF	2,151	22.00	47,322
63	Epoxy wall coating at decon and wash alcove-allow 8'	SF	328	16.00	5,248
281	Plam wall janitor rooms	SF	612	9.00	5,508
416	Allowance for misc. wall finishes/upgrades	LS	1	20,000.00	20,000
	Wall Finishes			\$9.15/SF	\$160,171
C3020	Floor Finishes				
66	Floor grates	LS	1	2,500.00	2,500
67	Athletic flooring-fitness room	SF	700	12.00	8,404
68	Polished concrete flooring	SF	15,851	7.50	118,879
69	Epoxy flooring-decon and wash alcove room-allow	SF	285	16.00	4,560
71	Rubber base allowance	SF	17,500	0.40	7,000
72	Ceramic tile base	LF	239	22.00	5,258
268	Ceramic tile flooring	SF	664	22.00	14,615
415	Allowance for flooring upgrade at lobby	LS	1	25,000.00	25,000
	Floor Finishes			\$10.64/SF	\$186,216
C3030	Ceiling Finishes				
73	ACT ceilings @ sleep rooms	SF	902	6.50	5,863
74	GWB ceilings-at restrooms/showers	SF	664	12.00	7,968
75	Acoustical cloud @ dayroom	SF	496	30.00	14,880
76	Ceilings-open to structure/seal-paint	SF	15,934	1.85	29,478
414	Allowance for special ceilings	LS	1	15,000.00	15,000
	Ceiling Finishes			\$4.18/SF	\$73,189
D2010	Plumbing Fixtures				
77	Plumbing allowance	SF	17,500	34.00	595,000
	Plumbing Fixtures		<u> </u>	\$34.00/SF	\$595,000
D3090	Other HVAC Systems and Equipment				
D3090	Other HVAC Systems and Equipment	SF	17 500	43.00	752 500
D3090 78	Other HVAC Systems and Equipment HVAC allowance Other HVAC Systems and Equipment	SF	17,500	43.00 \$43.00/SF	
78	HVAC allowance Other HVAC Systems and Equipment		17,500		
78 D4040	HVAC allowance Other HVAC Systems and Equipment Sprinklers			\$43.00/SF	\$752,500
78	HVAC allowance Other HVAC Systems and Equipment	SF	17,500 17,500		752,500 \$752,500 119,000 \$119,000



Station 51 Detail

Station 51 Area: 17,500 SF Rates Current At September 2019

Descri	ption		Unit	Qty	Rate	Total Cost
D5090	Other Electrical Services					
80	Building electrical-allowance		SF	17,500	43.50	761,250
		Other Electrical Services			\$43.50/SF	\$761,250
E1090	Other Equipment					
81	Extractor/dryer		LS	1	28,500.00	28,500
82	Dishwasher		EΑ	1	1,500.00	1,500
83	Refrigerator/Freezer		EA	5	3,600.00	18,000
84	Range/oven/hood		LS	1	9,800.00	9,800
85	Bunker gear lockers		EA	21	545.00	11,445
86	Cascade fill station-FOIC		LS	1	2,500.00	2,500
87	Hose dryers-FOIO		LS	1		Excl.
88	Misc. equipment/FOIC		SF	17,500	0.35	6,125
273	Washer/Dryer		EA	3	2,500.00	7,500
		Other Equipment			\$4.88/SF	\$85,370
E2010	Fixed Furnishings					
89	Shift lockers		EA	44	1,200.00	52,800
98	Window treatment/shades		SF	3,500	9.85	34,475
99	Casework allowance		SF	17,500	8.50	148,750
		Fixed Furnishings			\$13.49/SF	\$236,025
Z1010	General Conditions					
177	General conditions		Mth	14	42,500.00	595,000
		General Conditions			\$34.00/SF	\$595,000
		ESTIMATED NET COST			\$389.22/SF	\$6,811,393

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Station 51 Site Work Summary

Site area station 51: 74,000 SF Rates Current At September 2019

Desc	ription		Cost/SF	Total Cost
G10	Site Preparations		\$5.98	\$442,641
	•		-	
G20	Site Improvements		\$4.59	\$339,300
G30	Site Civil/Mechanical Utilities		\$6.85	\$506,960
G40	Site Electrical Utilities		\$0.74	\$55,000
Z10	General Conditions		\$1.15	\$85,000
		ESTIMATED NET COST	\$19.31	\$1,428,901
MAR	GINS & ADJUSTMENTS			
Desig	gn Contingency-Site	20.0 %		\$285,780
Conti	actors Overhead & Profit	7.5 %		\$128,601
		ESTIMATED TOTAL COST	\$24.91	\$1,843,282

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Station 51 Site Work Detail

Site area station 51: 74,000 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
G1010	Site Clearing				
397	Site clearing, hard surface demolition, misc. demolition	LS	1	85,355.00	85,355
	Site Clearin	ng		\$1.15/SF	\$85,355
C4000	Cita Damalitian 9 Dalacations				
G1020 283	Site Demolition & Relocations	SF	11,791	12.00	141,492
203	Building demolitions Site Demolition & Relocation		11,791	\$1.91/SF	\$141,492 \$141,492
	Site Demonitor & Nelocation	13		φ1. 9 1/3Γ	φ141,492
G1030	Site Earthwork				
108	Temporary Erosion Control	SF	74,000	0.50	37,000
398	Earthwork	LS	1	178,794.00	178,794
	Site Earthwo	rk		\$2.92/SF	\$215,794
G2020	Parking Lots				
115	Wheel stops allow	EA	6	125.00	750
399	Asphalt, concrete surfacings ,curbs	LS	1	234,300.00	234,300
	Parking Lo	ts		\$3.18/SF	\$235,050
00000	Podostnica Povina				
G2030	Pedestrian Paving	1.0	4	4 000 00	4 000
402	ADA ramp Pedestrian Pavir	LS ———	1	4,000.00 \$0.05/SF	4,000
	reuestilali ravii	ig		<i>\$0.03/3Г</i>	\$4,000
G2040	Site Development				
129	Misc. bollards-allow	EA	8	1,200.00	9,600
400	Retaining wall	SF	375	99.00	37,125
401	Misctraffic control, fencing,trench	LS	1	19,580.00	19,580
	Site Developme	nt		\$0.90/SF	\$66,305
G2050	Landcaping				
282	Lanscape/irrigation-70%lawn/30%shrubs-trees	SF	15,500	2.19	33,945
	Landcapir		,	\$0.46/SF	\$33,945
					. ,
G3010	Water Supply		4	45 000 00	45.000
404	Water system onsite adjust/modify allowance	LS	1	15,000.00	15,000
	Water Supp	uy .		\$0.20/SF	\$15,000
G3020	Sanitary Sewer				
405	Sanitary Sewer system onsite adjust/modify allowance	LS	1	15,000.00	15,000
	Sanitary Sew	er		\$0.20/SF	\$15,000

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Station 51 Site Work Detail

Site area station 51: 74,000 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
G3030	Storm Sewer				
403	Storm drainage systems	LS	1	476,960.00	476,960
	Storm Sewer			\$6.45/SF	\$476,960
G4010	Electrical Distribution				
413	Site electrical-modify lighting, feeders,comm allow	LS	1	55,000.00	55,000
	Electrical Distribution			\$0.74/SF	\$55,000
Z1010	General Conditions				
178	General conditions	Mth	2	42,500.00	85,000
	General Conditions			\$1.15/SF	\$85,000
	ESTIMATED NET COST			\$19.31/SF	\$1,428,901

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CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for:

Rice Fergus Miller Architecture



Prepared by:

Corbin M. Hammer, P.E., S.E. Principal Engineer

Katherine R. Brawner, P.E. Project Engineer

Reid Middleton

728 134th Street SW, Suite 200 Everett, WA 98204 425-741-3800 File No. 262019.052

1.0 Executive Summary

Seismic screenings and structural evaluations were performed for eight Central Kitsap Fire and Rescue fire facility buildings to investigate seismic deficiencies. All buildings evaluated in this study are low-rise structures and include seven fire stations and one support facility. Each building is considered critical to the City's ability to provide post-earthquake emergency services.

The evaluations determined each building's expected structural performance for an Immediate Occupancy performance objective. After a seismic event, buildings that meet an Immediate Occupancy performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. This report includes a description of each building, the identified seismic deficiencies, seismic-upgrade concept designs for four of the active stations, and recommendations. All the buildings were found to have seismic deficiencies and do not meet the Immediate Occupancy performance objective.

Concept-level seismic upgrade designs were completed for four of the stations and concept plans are provided describing options for mitigation of seismic deficiencies. Recommendations consist of strengthening and supplementing the existing lateral systems, improving lateral load paths, and improving connections. Additional factors such as operational use, functionality, response times, and historic value should also be considered in the decision-making process for these buildings.

3.3 Fire Station 51

3.3.1 Building Description

Year Built:

1979

Number of Stories:

1 + mezzanine

Floor Area:

12,400 SF

Address:

10955 Silverdale

Way NW,

Silverdale, WA



Fire Station 51, known as the Silverdale Community Fire Station, was built in 1979 and is a one-story wood-framed structure with a rectangular apparatus bay and C-shaped living quarters. Original construction includes a mezzanine located in the northwest corner of the apparatus bay; the original mezzanine was expanded after 1979. The apparatus bay has a roof height of 18 feet and steps down approximately 7 feet for the remainder to the building. The building has overall rectangular dimensions of 102 feet by 151 feet with a rectangular cut-out of 26 feet by 50 feet, creating the C-shape, at the north side of the building. Building construction consists of wood-framed walls and roof systems. Fire Station 51 serves as the Central Kitsap Fire and Rescue headquarters and houses two engines, one ladder truck, two medic vehicles, one boat, and one battalion vehicle.



Figure 3.3-1. Fire Station 51, North Exterior.



Figure 3.3-2. Fire Station 51, Exterior looking Northwest.

Structural System

Table 3.3-1. Structural System Description of Fire Station 51.

Structural System	Description
Roof	Over the apparatus bay, the roof system is composed of glulam beams and wood purlins supporting plywood sheathing. The remainder of the building consists of a mix of glulam beams, rough sawn lumber, and open web trusses with plywood sheathing.
Floor	The apparatus bay floor system consists of a 7-1/2-inch slab on grade, while the remainder of the building has a 4-inch slab on grade. The mezzanine consists of rough-sawn lumber and plywood sheathing.
Foundations	The walls are supported by continuous concrete spread footings.
Hose Tower	The hose tower is composed of wood-framed walls and wood roof framing.
Lateral System	Wood-framed shear walls provide lateral resistance in both the transverse and longitudinal directions. Framing with plywood sheathing shear walls resist forces in the longitudinal and transverse directions.

3.3.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.3-2. Identified Seismic Deficiencies for Fire Station 51.

Deficiency	Description
Mezzanines	The expanded mezzanine is not anchored to the LFRS and does not have its own lateral system. Without proper seismic bracing, a mezzanine poses a serious collapse hazard.
Shear Stress Check	The shear stress in the wood shear walls exceeds 1,000 pounds per linear foot. The walls may not have adequate strength to resist seismic forces.
Openings	The east apparatus bay wall has openings that make up more than 80% of the length of the wall. Intermediate walls have aspect ratios larger than 1.5-to-1. Walls with large openings have little to no shear resistance.
Hold-Down Anchors	Hold-down anchors are not specified in the drawings and due to the building age are not anticipated to be present at all shear walls. Shear walls without hold-downs have limited capacity to resist seismic forces due to uplift and racking.
Narrow Wood Shear Walls	Shear walls with aspect ratios exceeding 1.5-to-1 are being utilized to resist seismic forces. Walls with large aspect ratios are likely to be highly stressed and subject to severe deformations that reduce capacity.
Diaphragm Continuity	The step between the apparatus bay diaphragm and remainder of the building creates a discontinuity. Discontinuity in diaphragms may cause one or both to act as a cantilevered diaphragm, increasing lateral deflection.
Roof Chord Continuity	Diaphragm chord elements are not continuous through the diaphragm separation. Diaphragms with discontinuous chords are prone to higher deflections, causing damage along the perimeter of the structure.
Diagonally Sheathed and Unblocked Diaphragms	Diaphragms and unblocked spans exceed 30 feet. Diaphragms with large spans are subjected to higher shear and deflections.

An additional concern are the horizontal shear cracks present in the existing 4x10 roof framing in the apparatus bay and mezzanine. These cracks appear to be evidence that the beams have

reduced moisture content over time causing shrinkage cracking. Shrinkage cracking can cause the beam to not act as one section thus reducing its ability to support gravity loads.

There was no geotechnical report provided for the site in question, causing checklist items involving soil to be marked as "unknown". It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be completed for verification.

3.3.3 Findings and Recommendations

Fire Station 51 does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. The wood shear walls are overstressed, particularly at the apparatus bay doors, where an adequate lateral load path is not present. Shear wall anchorage and connections are also insufficient. Roof diaphragms are overstressed; cracking was observed in multiple roof framing members. Lateral system irregularities are also present at the hose tower and the expanded mezzanine. In addition, the gravity system shows signs of being overstressed. These deficiencies create a potential for damage and possible failure of the LFRS during a design-level earthquake. It is recommended that the building be replaced to meet the IO performance objective. Upgrading the existing building is also an option; however, with the combination of lateral and gravity deficiencies, a replacement may better suit the fire district's residents and the fire district.

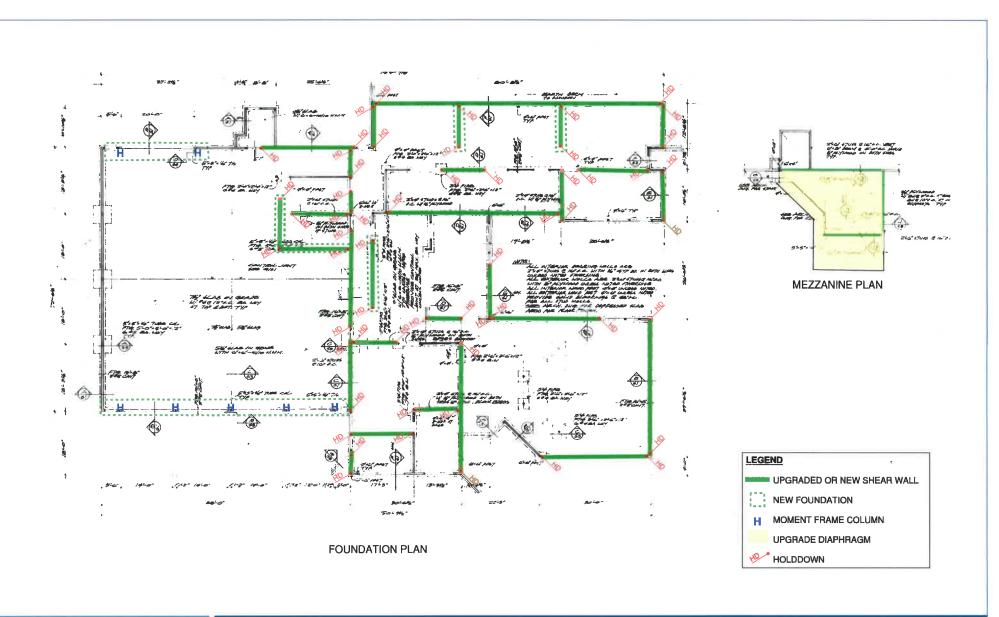
If the building is identified as a candidate for upgrades, Figures 3.3-3 and 3.3-4 display the schematic-level upgrade concepts to improve the LFRS and meet the IO performance objective. The upgrade concept involves adding shear capacity to the lateral system in both the longitudinal and transverse directions throughout the building, adding steel drag struts, adding nailing and blocking to the roof, and improving roof-to-wall connections.

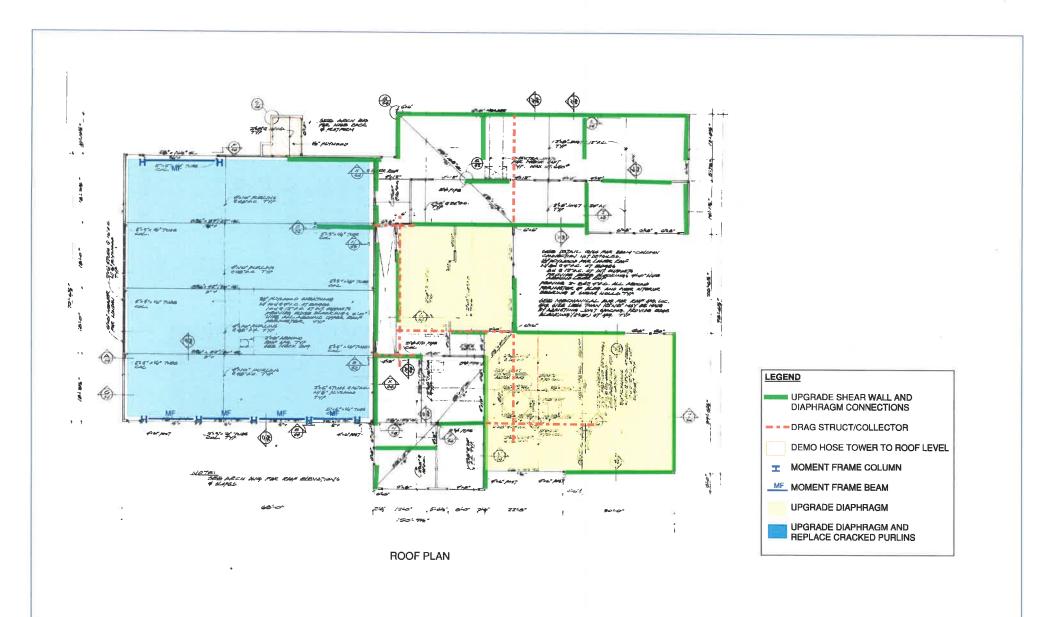
Strengthening existing shear walls, adding new shear walls, and adding steel moment-frames will increase shear capacity and improve the symmetry of the LFRS. The lengthening and addition of shear walls in the C-shaped portion of the building will increase shear capacity. The steel moment-frame will add strength around the apparatus bay doors. New walls will also be added at the mezzanine in the apparatus bay to create a lateral system. The new walls and the walls adjacent to lengthened walls should have new sill bolts and hold-downs installed in addition to having structural sheathing applied. Specified interior and exterior walls should also be resheathed with structural sheathing and have new hold-downs installed. Finally, the shear wall-to-roof connections and collector elements should be installed to provide a complete load path for the building to resist seismic loads. The shear-wall upgrades will increase shear capacity of the LFRS.

The existing hose tower should be removed above the roofline to reduce the seismic loading and seismic risk posed to the building.

Supplementary nailing and blocking are added to the roof to increase the roof diaphragm's capacity and strength. This includes the apparatus bay roof and the lower roof. The connection between the diaphragm and shear walls should also be improved using roof-to-wall ties to ensure

the forces are transferred to the shear walls. This upgrade will increase the diaphragm's stiffness and the diaphragm's shear capacity. All roof joists showing signs of shrinkage cracking should be upgraded or replaced. Drag struts and collectors are also being added to strengthen reentrant corners in the roof diaphragm and to adequately transfer seismic loads to wood shear walls.





3.4 Fire Station 51 Maintenance Building

3.4.1 Building Description

Year Built:

1979

Number of Stories: 1 + mezzanine

Floor Area:

2,500 SF

Address:

10955 Silverdale

Way NW,

Silverdale, WA



Fire Station 51 Maintenance Building is located to the west of Fire Station 51. The building is a single-story wood structure with a mezzanine located in the center of the building. The 1979 building is rectangular in plan, 60 feet by 42 feet, with a maximum roof height of 20 feet. A portion of the building on the north side that was shown on the record drawings as an open covered area has been enclosed; record drawings were not available for the enclosure construction. Building construction consists of wood-framed walls and wood-framed floor and roof systems.



Figure 3.4-1. Fire Station 51 Maintenance Building, South Exterior.



Figure 3.4-2. Fire Station 51 Maintenance Building, Roof Prop Leaning on North Exterior.

Structural System

Table 3.4-1. Structural System Description of Fire Station 51 Maintenance Building.

Structural System	Description
Roof	The lower building portion on the north side of the building has a roof composed of rough-sawn lumber. The remainder of the roof system is composed of open web trusses and plywood sheathing.
Floor	The floor for the apparatus bay is a 7-1/2-inch reinforced slab on grade, while the remainder of the structure has slab on grade varying from 4-1/2 to 5 inches. The mezzanine floor is composed of wood joists supporting plywood sheathing.
Foundations	The wood-framed walls are supported by continuous concrete spread footings. Columns enclosed in the north building portion are supported by individual footings.
Hose Tower	N/A.
Lateral System	Wood-framed shear walls resist forces in the longitudinal and transverse directions.

3.4.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.4-2. Identified Seismic Deficiencies for Fire Station 51 Maintenance Building.

Deficiency	Description
Narrow Wood Shear Walls	Walls between the south apparatus bay doors with aspect ratios exceeding 1.5-to-1 are being utilized. Narrow walls are likely to be highly stressed and subject to severe deformations that reduce capacity to resist seismic forces.
Openings	Openings in the south and east apparatus bays wall extend for more than 80% of the wall length. Walls with large openings have little to no shear resistance.
Hold-Down Anchors	Hold-down anchors are not present at all shear walls. Shear walls without hold-downs have limited capacity to resist seismic forces due to uplift and racking.

Roof Chord Continuity	Diaphragm chord elements are not continuous through the diaphragm step. Diaphragms with discontinuous chords are prone to higher deflections, causing damage along the perimeter of the structure.
Diagonally Sheathed and Unblocked Diaphragms	The diaphragm is unblocked. Unblocked diaphragms are prone to premature failure due to joist rolling, especially when spans exceed the recommended length of 30 feet.

There was no geotechnical report provided for the site in question, causing checklist items involving soil to be marked as "unknown." It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be completed for verification.

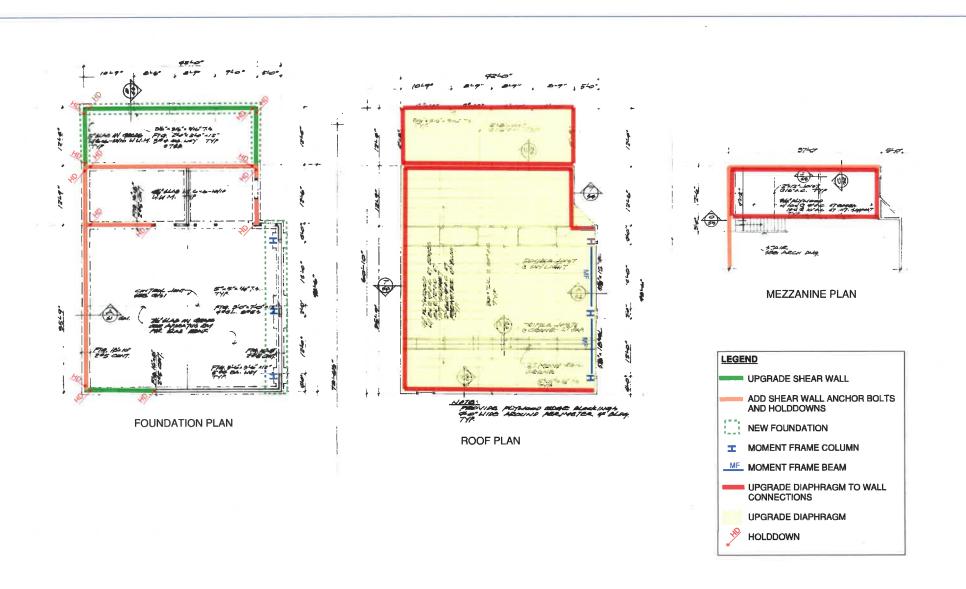
3.4.3 Findings and Recommendations

The Fire Station 51 Maintenance Building does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. Deficiencies include an inadequate lateral system, overstressed shear walls, inadequate wall connections at the roof and foundation, and inadequate roof diaphragm capacity. Due to the extent of the deficiencies, extensive damage and potential for failure of the LFRS during a design-level earthquake is possible. It is recommended that the building be replaced or upgraded to meet the IO performance objective.

If the building is identified as a candidate for upgrades, Figures 3.4-3 displays the schematic-level upgrade concept to improve the LFRS and meet the IO performance objective. The upgrade concept involves adding shear capacity to the lateral system in both the longitudinal and transverse directions throughout the building, adding diaphragm chords, adding nailing, connections, and blocking to the roof, and improving roof-to-wall connections.

The upgrade approach involves adding shear strength to the building by infilling windows to create a better load path, strengthening existing shear walls, and adding steel moment frames. The new walls and the walls adjacent to the infilled walls should have new sill bolts and hold-downs installed in addition to having structural sheathing applied. Specified interior and exterior walls should also be re-sheathed with structural sheathing and have new hold-downs installed. The steel moment frame will add strength and a lateral system around the apparatus bay doors. The shear wall upgrades will increase shear capacity of the LFRS.

The shear wall-to-roof connections and collector elements should be installed to provide a complete load path for the building to resist seismic loads. Supplementary nailing and blocking are added to the roof to increase the roof diaphragm's capacity and strength. This includes the apparatus bay roof and the lower roof. The connection between the diaphragm and shear walls should also be improved using roof-to-wall ties to ensure the forces are transferred to the shear walls. This upgrade will increase the diaphragm's stiffness and the diaphragm's shear capacity. Drag struts and chords are also being added to adequately transfer seismic loads to wood shear walls.



17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
	Х			MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	Expanded mezzanine not anchored to the LFRS.

Building System – Building Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		X		WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	One-story structure.
		Х		SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	One-story structure.
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
		х		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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	One-story structure.
		Х		MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	One-story structure.
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

C	NC	N/A	U	EVALUATION STATEMENT .	COMMENT
			X	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
			х	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			X	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-7. Immediate Occupancy Checklist for Building Type W2

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
	х			SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing, 1,000 lb/ft (14.6 kN/m); Diagonal sheathing, 700 lb/ft (10.2 kN/m); Straight sheathing, 100 lb/ft (1.5 kN/m); All other conditions, 100 lb/ft (1.5 kN/m). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec.A.3.2.7.1)	
X				STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multistory buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.2)	
X				GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.3)	
	X	6		NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	
		х		WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Tier 2: Sec. 5.5.3.6.2; Commentary: Sec. A.3.2.7.5)	*
		Х		HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Tier 2: Sec. 5.5.3.6.3; Commentary: Sec. A.3.2.7.6)	
		Х		CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Tier 2: Sec. 5.5.3.6.4; Commentary: Sec. A.3.2.7.7)	
	X			OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Tier 2: Sec. 5.5.3.6.5; Commentary: Sec. A.3.2.7.8)	
	х			HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices. (Tier 2: Sec. 5.5.3.6.6; Commentary: Sec. A.3.2.7.9)	

17-7. Immediate Occupancy Checklist for Building Type W2

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD POSTS: There is a positive connection of wood posts to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.3)	
X				WOOD SILLS: All wood sills are bolted to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.4)	
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
		х		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: 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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	Х			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	

Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	х			DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.1)	NC between apparatus bay and remainder of building.
	X			ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.3)	
		X		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	
		Х		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	

17-7. Immediate Occupancy Checklist for Building Type W2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	,
	Х			DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.1 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
X				OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less with acceptable edge and end distance provided for wood and concrete. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.7)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	No adjacent buildings, however a roof training prop was leaning against north wall.
X				MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	Anchored to LFRS.

Building System – Building Configuration

C NC		N/A	U	EVALUATION STATEMENT	COMMENT
		Х		WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	One story with mezzanine.
		х		SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	One story with mezzanine.
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
		х		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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	One story with mezzanine.
		х		MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	One story with mezzanine.
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

C N	ic N/.	/A U	EVALUATION STATEMENT	COMMENT
		X	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
	X	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.I.2)		
		Х	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

C NC N/		N/A	A .U	EVALUATION STATEMENT	COMMENT
x		the seismic-force- resisting system at the foundation level to the building height (base/height) is greater than 0.6S _a . (Tier 2: Sec.		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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		X		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-7. Immediate Occupancy Checklist for Building Type W2

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
X				SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing, 1,000 lb/ft (14.6 kN/m); Diagonal sheathing, 700 lb/ft (10.2 kN/m); Straight sheathing, 100 lb/ft (1.5 kN/m); All other conditions, 100 lb/ft (1.5 kN/m). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec.A.3.2.7.1)	
	<u> </u>	Х		STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multistory buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.2)	
X				GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.3)	55
	X			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	,
		X		WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Tier 2: Sec. 5.5.3.6.2; Commentary: Sec. A.3.2.7.5)	One story with mezzanine.
		Х		HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Tier 2: Sec. 5.5.3.6.3; Commentary: Sec. A.3.2.7.6)	
		X		CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Tier 2: Sec. 5.5.3.6.4; Commentary: Sec. A.3.2.7.7)	
	х			OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Tier 2: Sec. 5.5.3.6.5; Commentary: Sec. A.3.2.7.8)	
	Х			HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices. (Tier 2: Sec. 5.5.3.6.6; Commentary: Sec. A.3.2.7.9)	

17-7. Immediate Occupancy Checklist for Building Type W2

Connections

C NC		N/A	U	EVALUATION STATEMENT	COMMENT
			WOOD POSTS: There is a positive connection of wood posts to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.3)		
X				WOOD SILLS: All wood sills are bolted to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.4)	
		х		GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Foundation System

С	NC	IC N/A U EVALUATION STATEMENT		EVALUATION STATEMENT	COMMENT
			X	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
			X	SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: 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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	X			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	

Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT COMMEN	
X				DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.1)	
	X	ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.3)		continuous, regardless of changes in roof elevation. (Tier 2:	
		Х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	
		X STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)		have aspect ratios less than 1-to-1 in the direction being	

17-7. Immediate Occupancy Checklist for Building Type W2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
х			SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)		
	Х			DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.1 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	Unblocked diaphragm.
Х				OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less with acceptable edge and end distance provided for wood and concrete. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.7)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.



N.L. OLSON & ASSOCIATES, INC. Engineering, Planning & Land Surveying

2453 Bethel Avenue Port Orchard, WA 98366 P. 360-876-2284 / F.360-876-1487 www.nlolson.com

TECHNICAL MEMORANDUM ABREVIATED PROJECT STORM DRAINAGE ANALYSIS

Project: Central Kitsap Fire & Rescue Station 51, Silverdale Way

To: Rice Fergus Miller, Attn: Lorie Cook Subject: Stormwater Management System

Date: September 26, 2019 From: Richard Langford

This Technical Memorandum (TM) summarizes the storm drainage analysis and system design feasibility requested by RFM of the proposed improvements of Central Kitsap Fire Rescue Station 51 located at 10955 Silverdale Way. The proposed improvements include the replacement of the existing station house with a new 15,000 sf building, the construction of ~43,000 sf of asphalt and sidewalk and 0.35 acres of landscaping. Two detention barrel vault systems will be constructed to provide flow control. Each system will have its own underground water quality device. The proposed site plan will require the removal/demolition of the existing station building and approximately 41,000 sf of asphalt and concrete and the removal or abandonment if some existing utilities.

The site is evaluated for stormwater mitigation minimum requirements thresholds for Development and Redevelopment per Kitsap County Stormwater Manual (KCSWM) Vol 1, chapter 4 flow charts 4.1 and 4.2. Because the site's runoff discharges to Clear Creek direct discharge is not applicable minimum requirements 1-9 apply to this project.

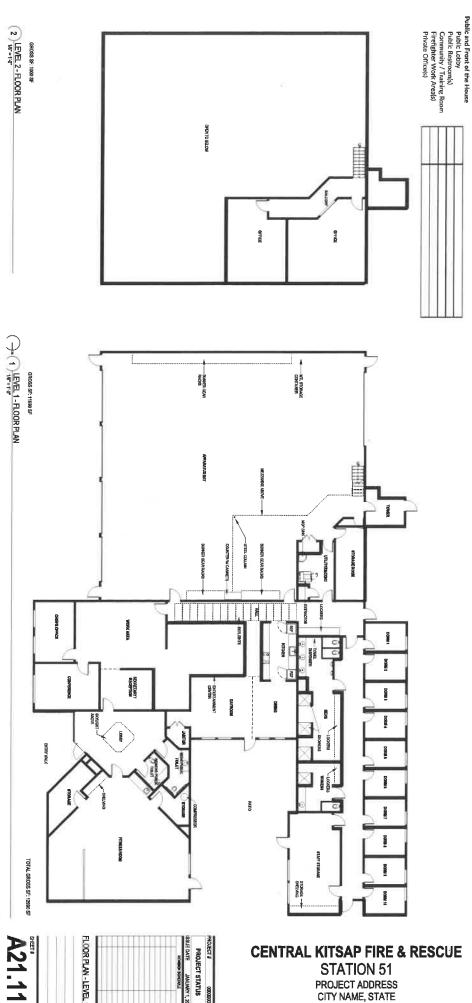
The following parameters are the basis for the sizing of the detention systems, and water quality mitigation and the conveyance systems. Based on the geotechnical report infiltration is not considered feasible, consequently a two detention tanks are proposed. The WWHM 2012 continuous flow model program with a Quilcene 0.8 rain gauge is used for analysis.

- Total disturbed area is 74,000 sf (1.7 ac).
- Impervious area is 43,000 sf (1.00 ac).
- Building foot print is 15,500 sf (.35 ac).
- Landscaped & pond area is 15,500 sf (0.35ac).

The detention volume needed for flow control requirements is separated into two vault systems. The two system arrangement is used to facilitate maximum capture of runoff while utilizing exiting grades. For a passing duration test from the site system one measures 600 lf of 8 foot diameter pipe, and system two measures 550 lf of 5 foot diameter pipe. Water quality vault for system one is a 6' x 8' Bio-pod underground vault. System two will require a 4'x 6' Bio-pod underground vault. The two systems will discharge to the existing 24" diameter conveyance in Silverdale Way ROW fronting the site. With the preliminary grading plan an estimated 3,000 cy of material will have to be imported onto the site to raise existing grade to provide appropriate cover for the proposed detention systems.

NL OLSON & ASSOCIATES INC			_	roject:		verdale Way C	KFF	R STA 51
Prepared By:	RHL		CI	lient:	RF	M		
			Di	ate:	26	-Sep-19		
Brief Scope:	Project Bu	1						
Building Size:	~15,000	SF		overepinen.		,,,,,,,		
Site Size:	~1.7	Acres	-		-			
		-	,	440.4	-			
Description	Quantity	Unit	_	\$/Unit	-	Cost	Total	
Construction Cost							\$	1,163,448.40
Mobilization					-		-	
site and off-site	1	allowance	\$	80,000.00	\$	80,000.00		
Sub-Total			Ť		Ť	,	\$	80,000.00
Demolition							-	00,000.00
remove drainfield	0	allowance	\$	5,000.00	\$			
decommission well		allowance		3,000.00	-	-		
dispose of asphalt	1200		\$	60.00	-	72,000.00		
sawcut pavement	300		\$	3.50	\$	1,050.00		
buildings demolish not included	0	allowance		18,000.00	\$			
Sub-Total		1	Ť	,	7		\$	73,050.00
Earthwork							Ť	,
clear/grub/strip	0	acre	\$	5,000.00	\$			1111
strip organic layer	130	су	\$	8.00	\$	1,040.00		
excavation	4,000		\$	8.00	\$	32,000.00		
embankment compaction	3000		\$	4.00	\$	12,000.00		
fine grade road	43000	sf	\$	0.50	\$	21,500.00		
Import	3000	су	\$	6.00	\$	18,000.00		
rataining wall	375		\$	90.00	\$	33,750.00		
Sub-Total							\$	118,290.00
Paving and Concrete								
Asphalt 2"HMA 1/2" 58-22	1200	ton	\$	100.00	\$	120,000.00		
crushed rock 2"	500	ton	\$	35.00	\$	17,500.00		
gravel base 6"	1500	ton	\$	28.00	\$	42,000.00		
sidewalk	50	sy	\$	80.00	\$	4,000.00		
ADA Stall	5	ea	\$	2,000.00	\$	10,000.00		
curb and gutter sidewalk	60	. If	\$	25.00	\$	1,500.00		
extruded asphalt curb	1000	lf	\$	18.00	\$	18,000.00		
Sub-Total							\$	213,000.00
Storm drainage								
CB's Type I	15	ea 、	\$	1,200.00	\$	18,000.00		
CB type 2	5	ea	\$	2,500.00	\$	12,500.00		
CB type 2 with riser	2	ea	\$	3,500.00	\$	7,000.00		
18" storm pipe (ADS N-12)	0	lf	\$	45.00	\$			
12" storm pipe (ADS N-12)	800		\$	35.00	\$	28,000.00		
Driveway trench drain	110	lf	\$	15.00	\$	1,650.00		
8" storm pipe (ADS N-12)	450	If	\$	25.00	\$	11,250.00		
6" storm pipe (ADS N-12) tightline	300	lf	\$	19.00	\$	5,700.00		
8' diameter cmp	600	lf	\$	280.00	\$	168,000.00		
6' diameter cmp	550	lf	\$	230.00	\$	126,500.00		
8' x 6' biopod	1	ea	\$	32,000.00	\$	32,000.00		
6' x 4' biopod	1	ea	\$	23,000.00	\$	23,000.00		
Sub-Total								\$433,600.00
Site Water system								
Waer system revsion not included	0	allowance	\$	30,000.00	\$	-		
Sub-Total							\$	-

Site Sanitary Sewer							
Sewer System revision not included	0	allowance	\$	10,000.00	\$	-	
Sub-Total							\$
Erosion Control							
filter fence	650	If	\$	6.00	\$	3,900.00	
quarry spall entrance	1	ea	\$	4,000.00	\$	4,000.00	
sediment trap rock	20	tons	\$	25.00	\$	500.00	
ditches	300	lf	\$	1.00	\$	300.00	
hydroseeding	1.7	acres	\$	4,000.00	\$	6,800.00	
Sub-Total							\$ 15,500.00
Miscellaneous							
fencing	0	lf	\$	50.00	\$	-	
misc traffic control	1	allowance	\$	5,000.00	\$	5,000.00	
dry utility trench (replacement)	400	lf	\$	22.00	\$	8,800.00	
landscaping	1	allowance	\$	20,000.00	\$	20,000.00	
signage	1	allowance	\$	4,000.00	\$	4,000.00	
Sub-Total							\$ 37,800.0
Overhead & Profit	10%	%		\$971,240.00	\$	97,124.00	
Sub-Total							\$ 97,124.0
Sales Tax 8.9%	8.9%	%	9	1,068,364.00	\$	95,084.40	
Sub-Total							\$ 95,084.4
TOTAL					\$1,163,448.40		\$ 1,163,448.4
Does not include:							
Utility Connection or revsion Costs,							
Impact Fees							
Permit Fees							
Enginerring & Survey							



NOT FOR CONSTRUCTION

Living Quarters
Sleep Rooms
Restroom/Showers
Kitchen
Dining
Dayroom
Fitness
Laundry
Janttorial

Operations
Apparatus Bay
Decon
Shop
Clean Project Room
App Bay Restroom
Bunker Cear Storage
General Storage
App Bay Janitonial

Program Needs Checklist
Fire Station Remodel

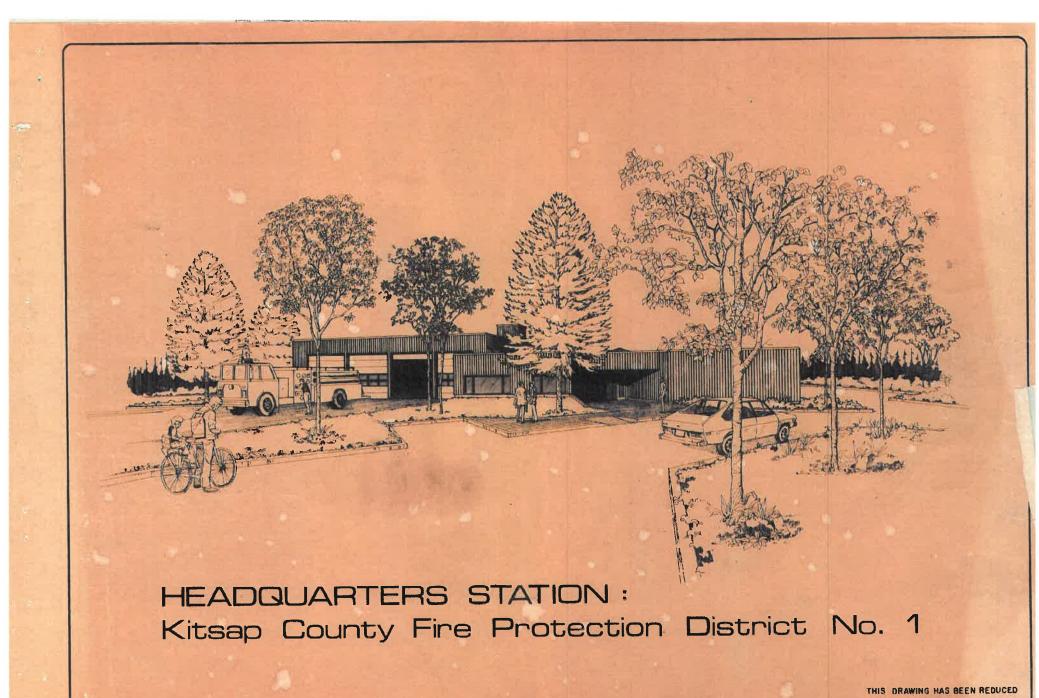
Currently Adequate? (Yes/No)

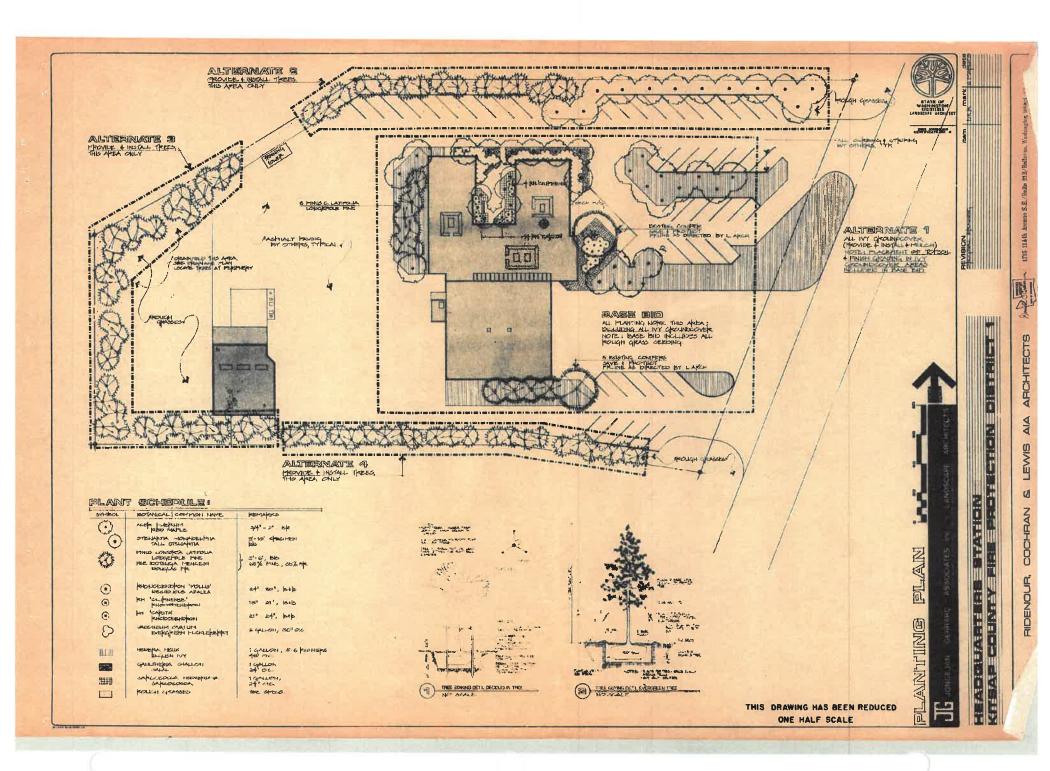
Needed improvements

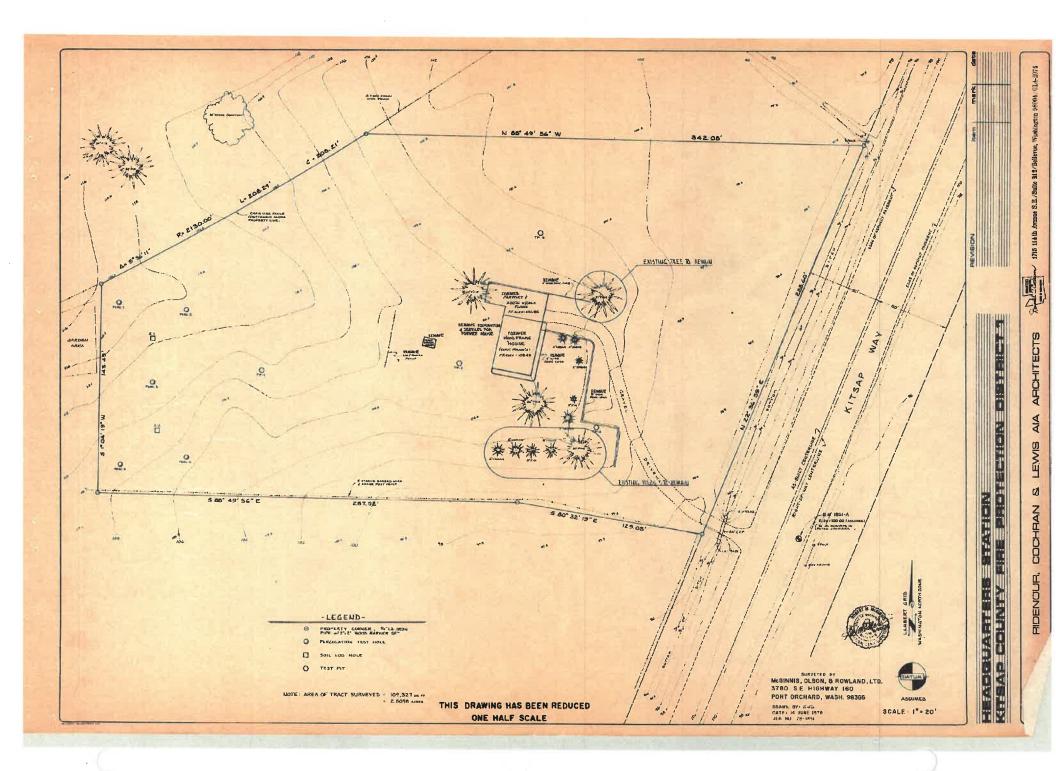
ACHITICAS PROPERTIES PLANIAGO VIZLAS
275 FIFTH STREET, SUITE 100
BREMERTON, WA 88387
380-377-8773

FLOOR PLAN - LEVEL 1

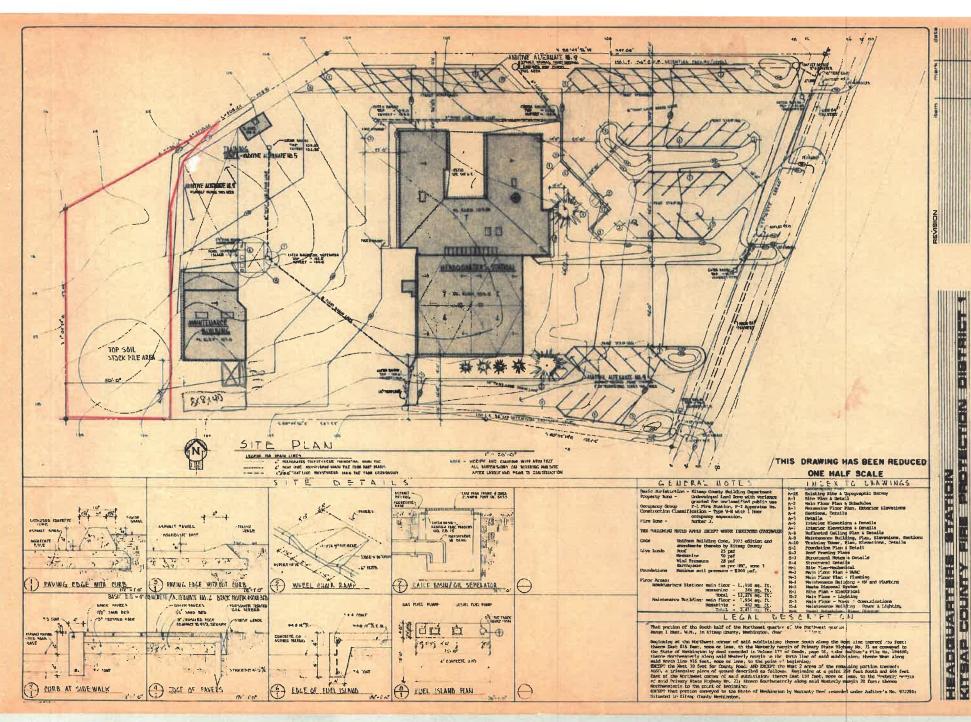
CENTRAL KITSAP FIRE & RESCUE STATION 51 PROJECT ADDRESS CITY NAME, STATE

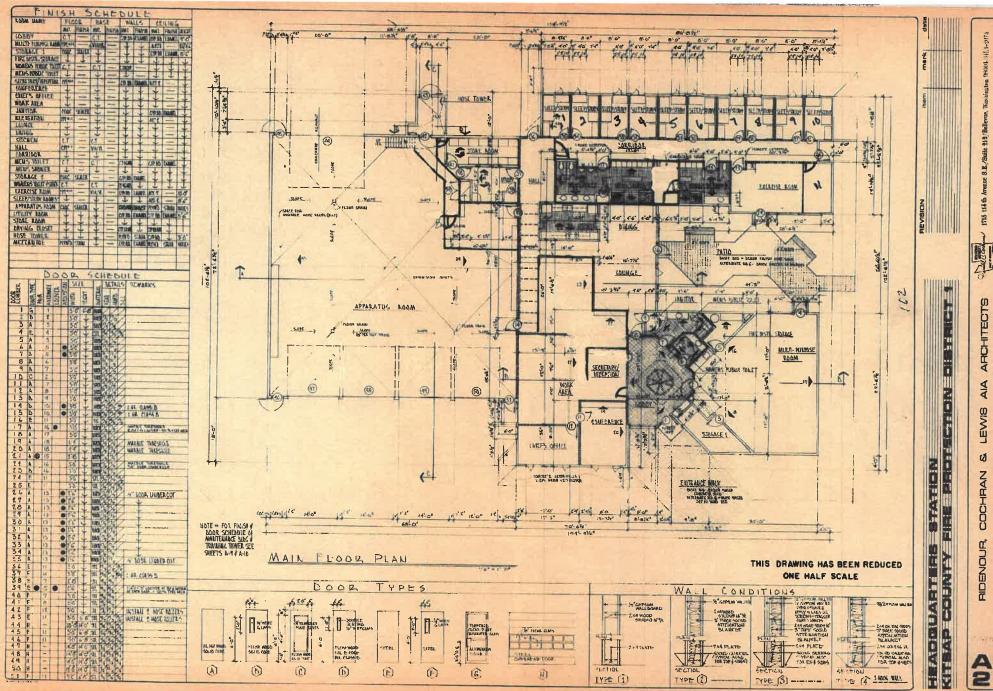












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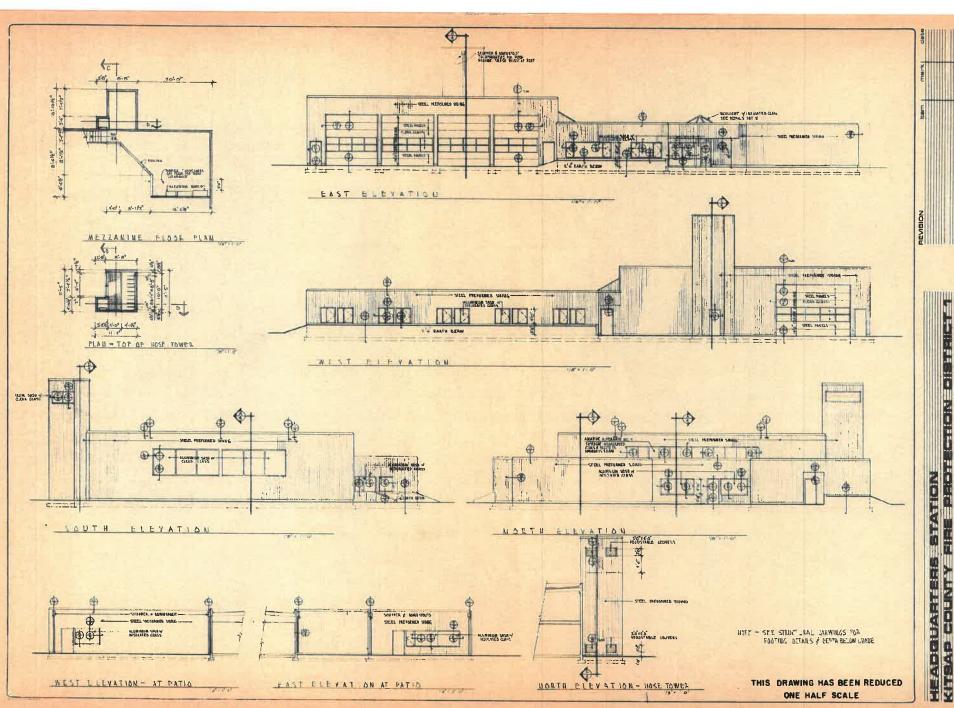
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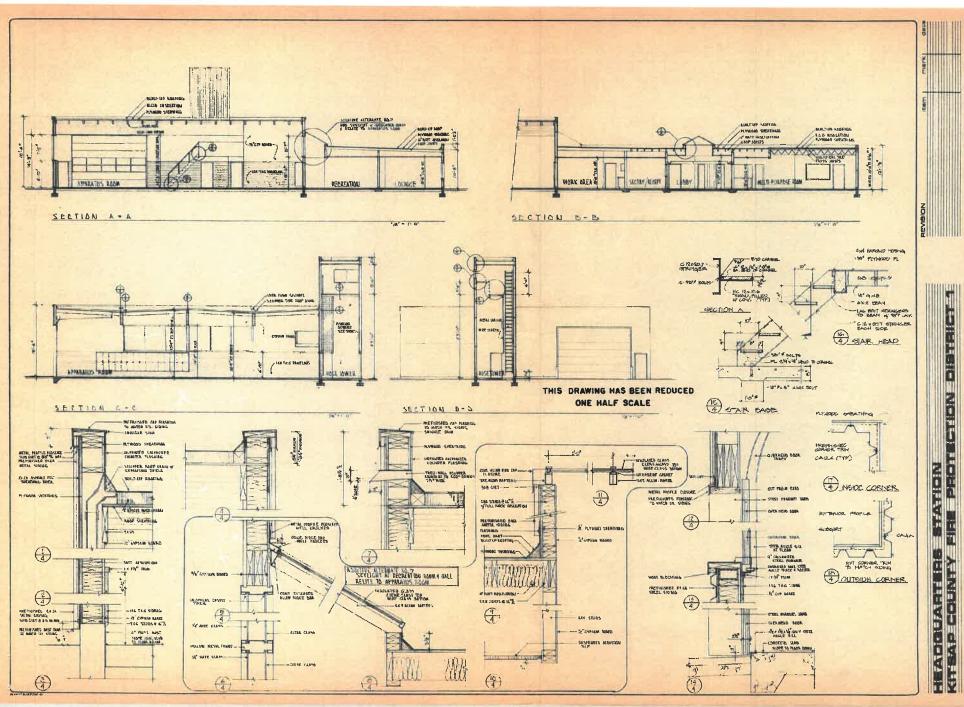
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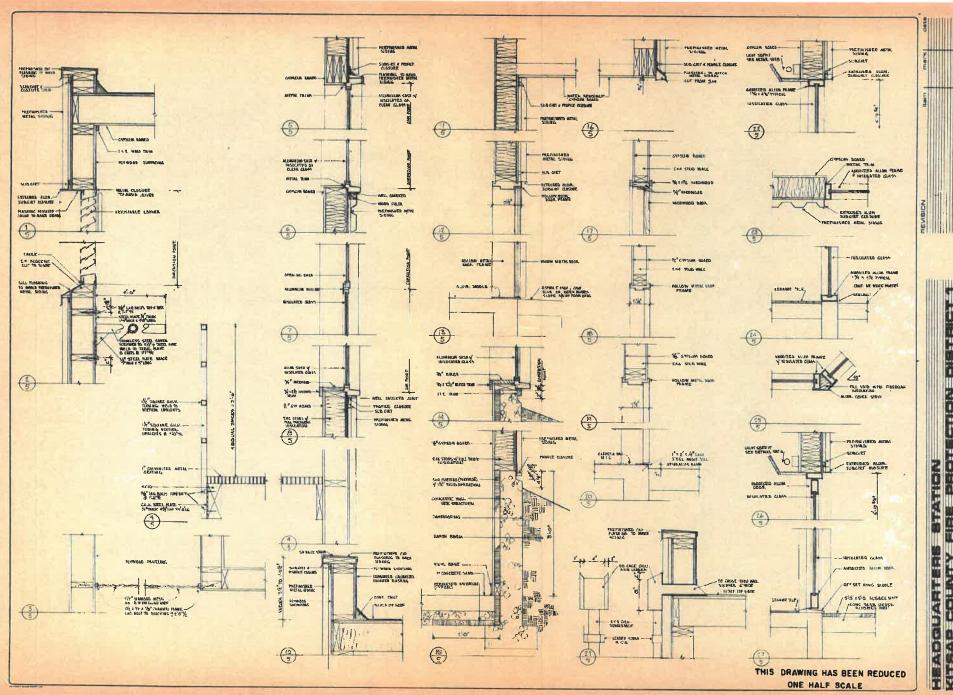


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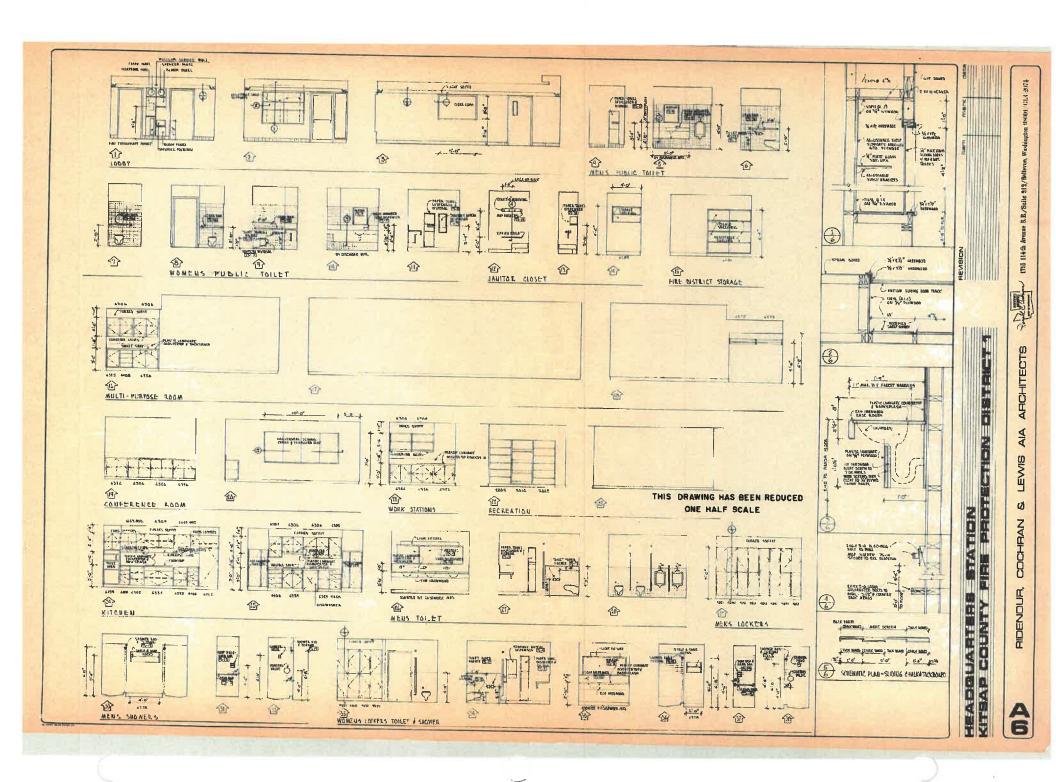
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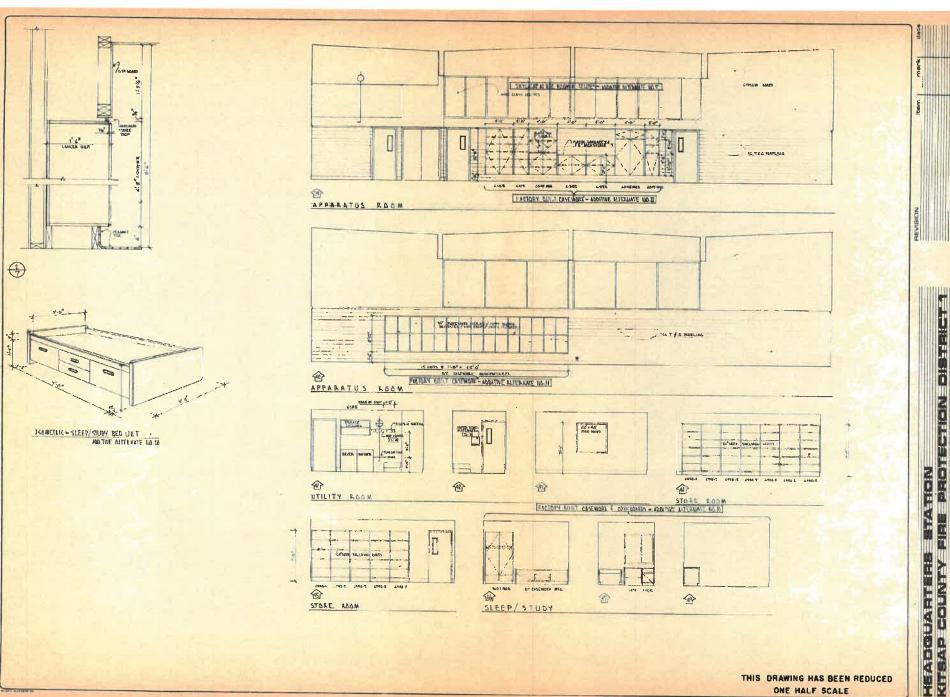


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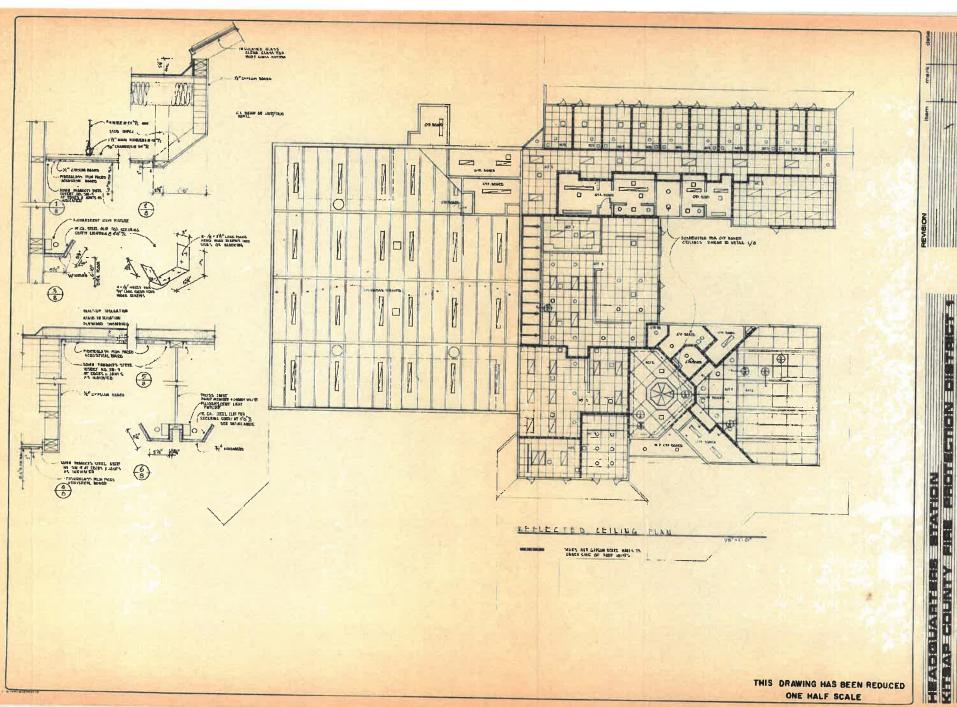
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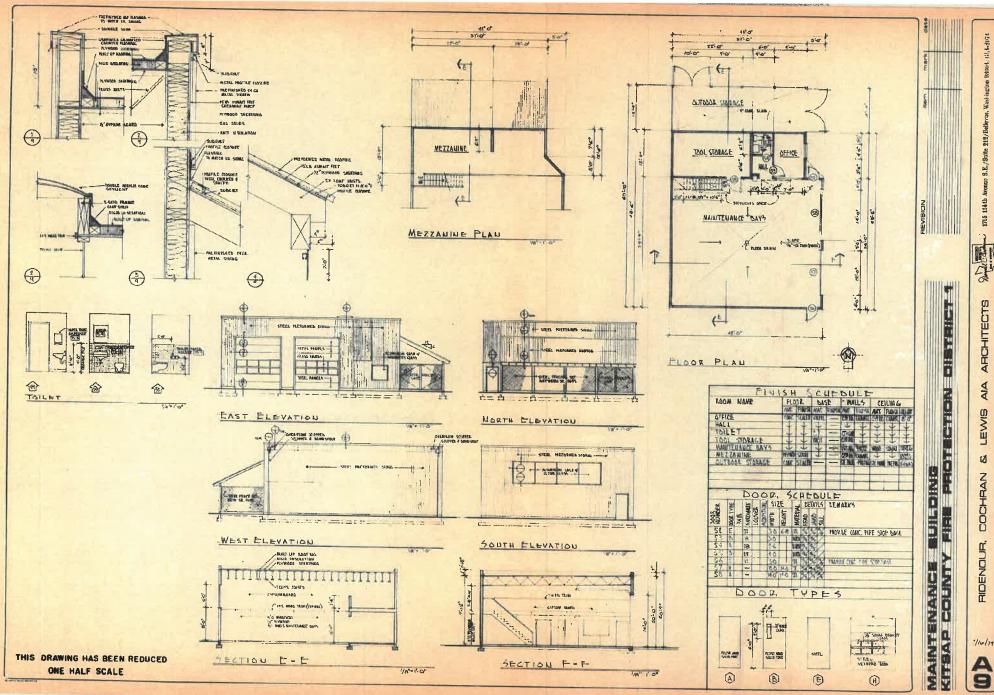


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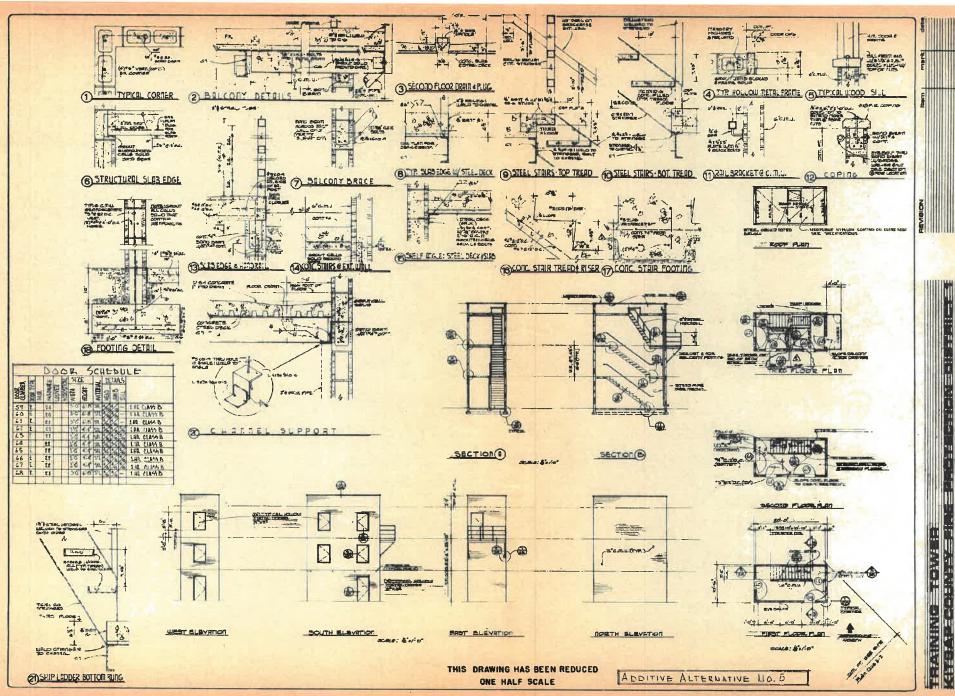
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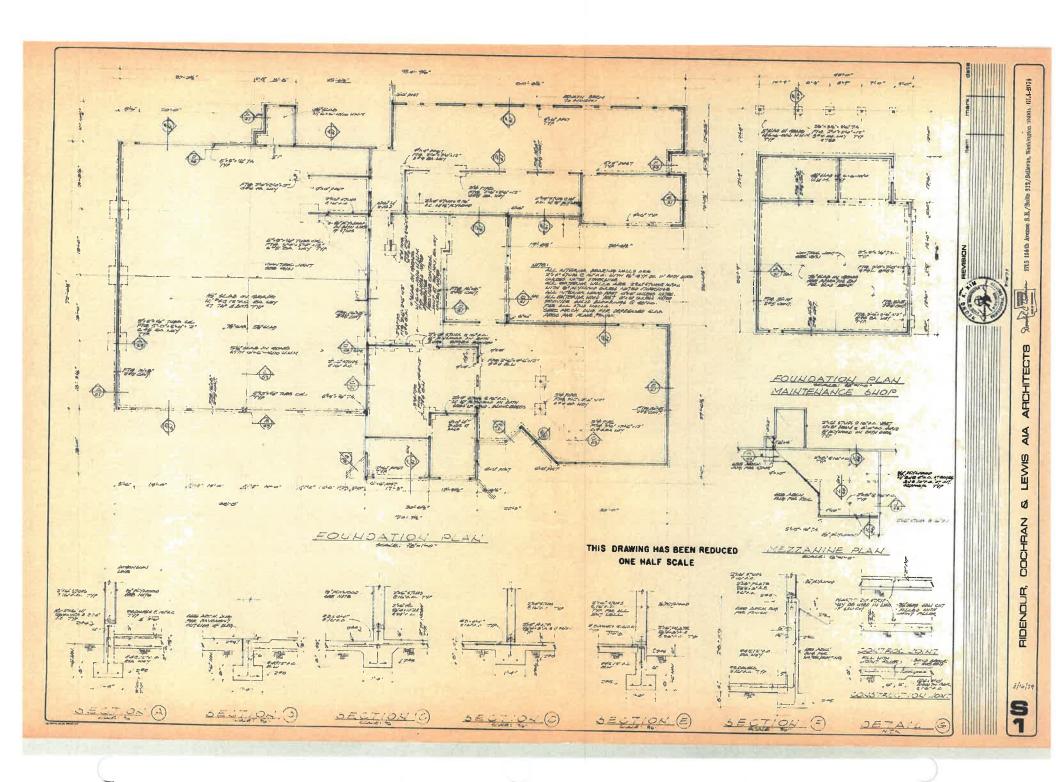


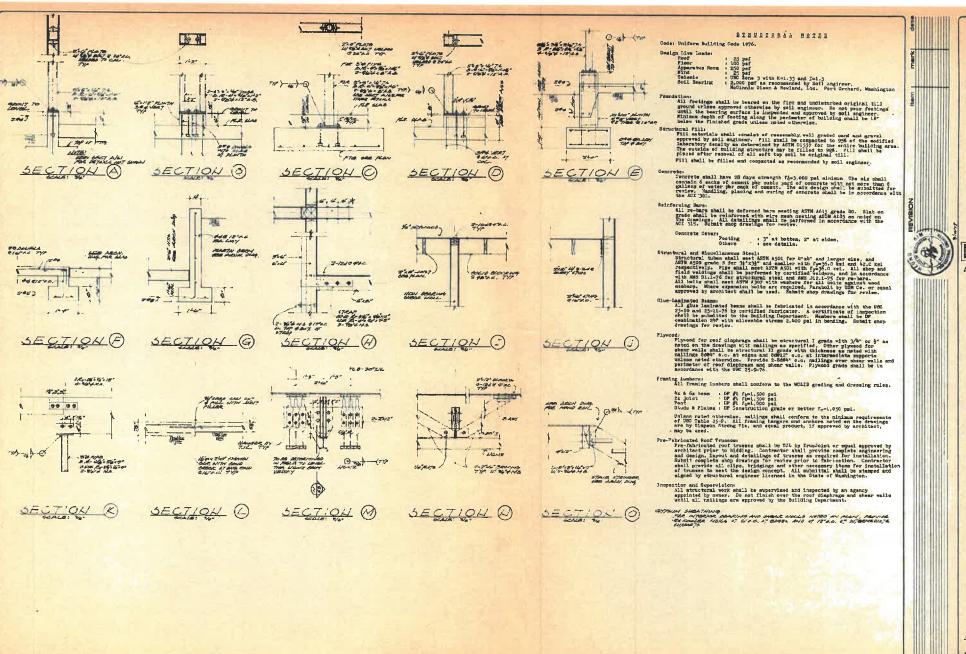
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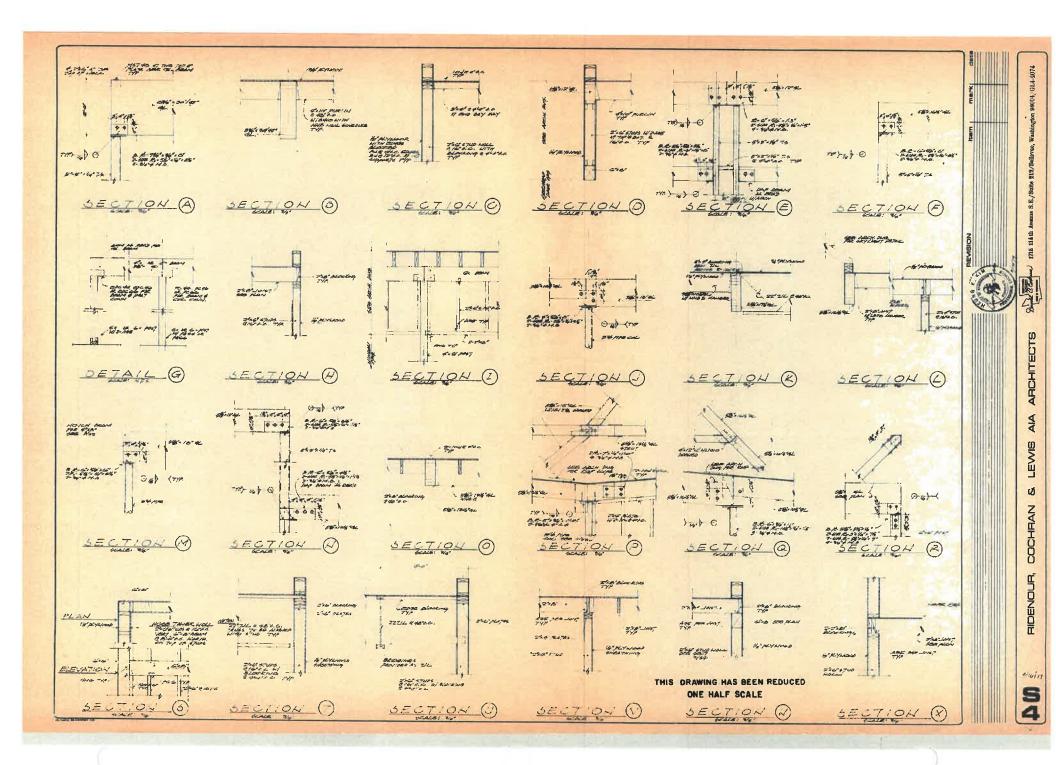
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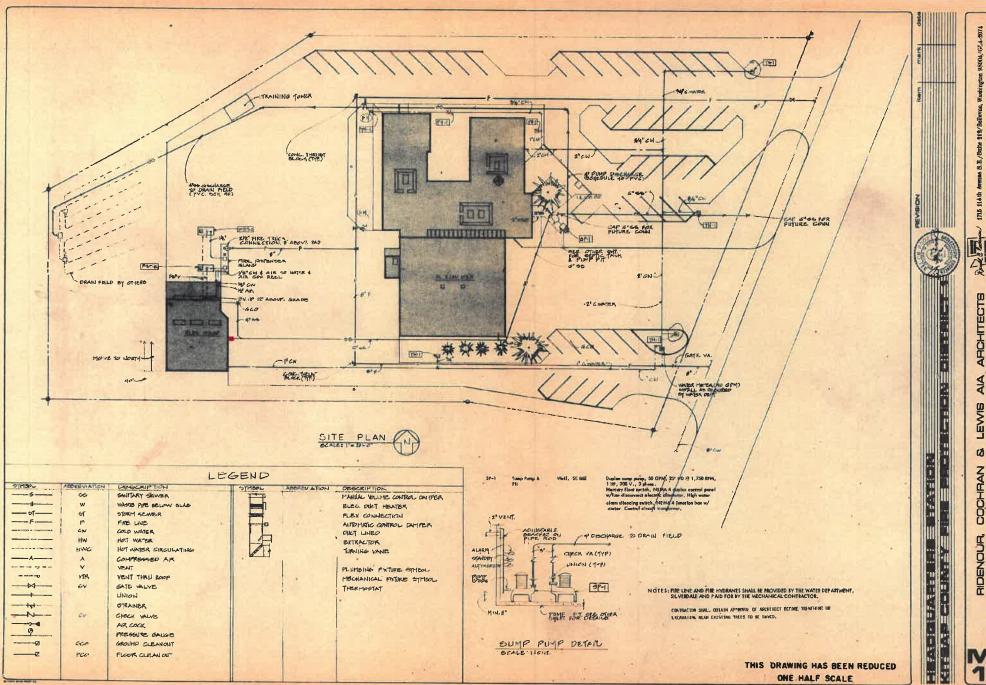
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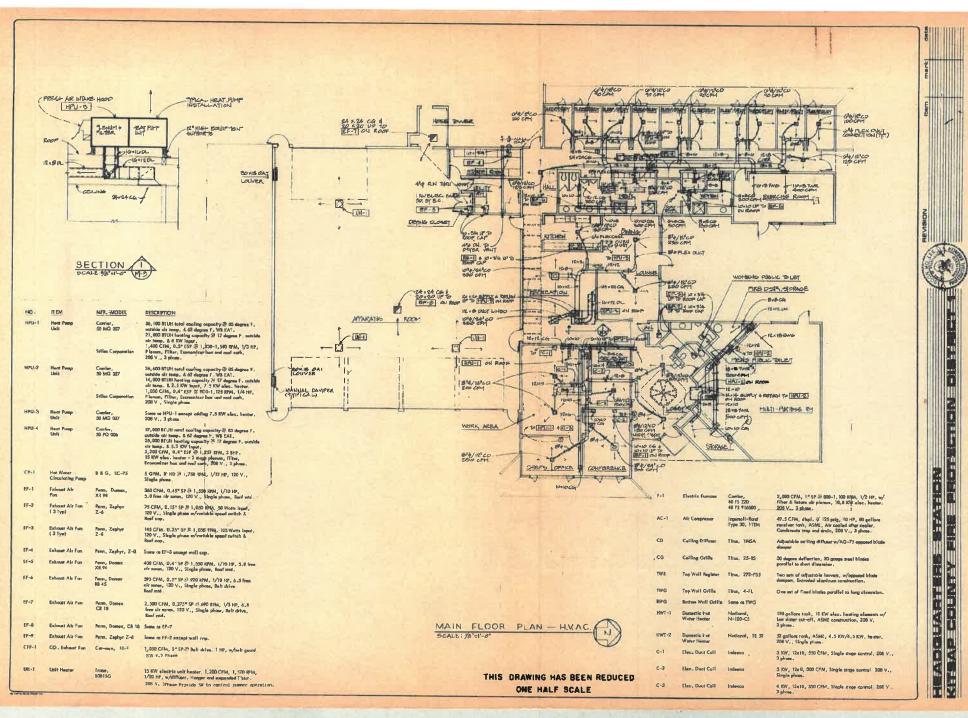
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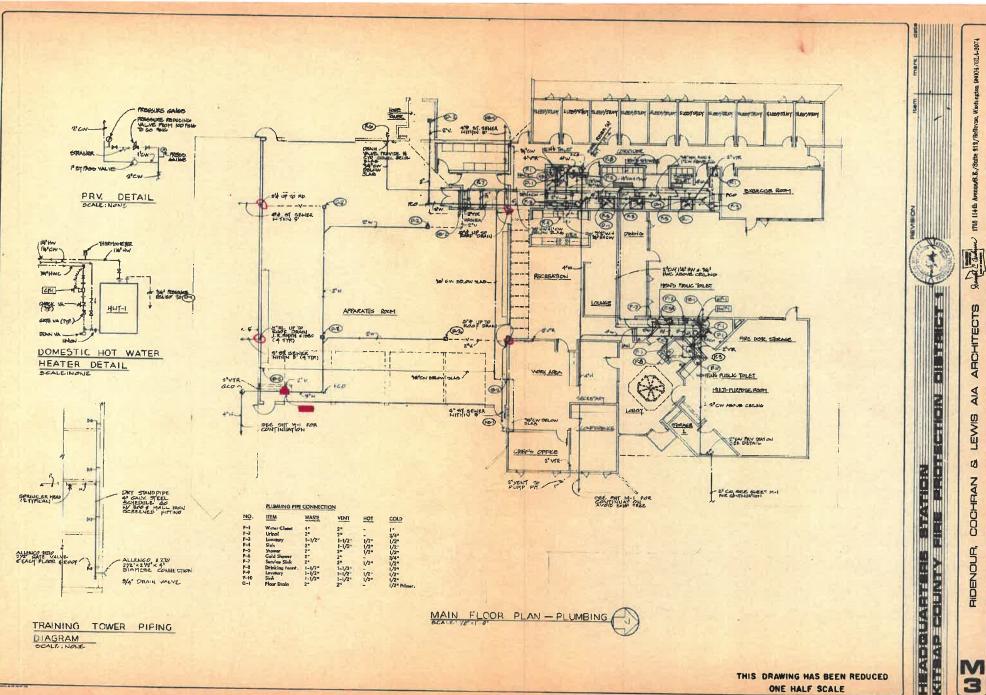




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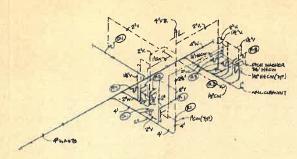
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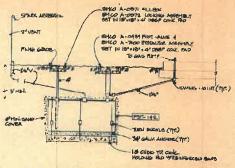
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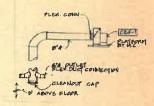


PLUMBING RISER "A"

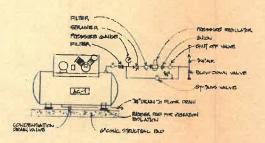
	PLUMBING FI	XTURE SCHEDULE	
NO.	ITEM	DESCRIPTION	MFRMODEL
P-1	Water Cluset	Wall hung, Vitreous chino, Siphen jet, Elargeted open front east Flash valve	Am Std 2502,011 Church, 5321.078 Sloon Royal, 110
P-2	United	Virmous chine, Wall hung Flush valve	Am. Std. 6530.018 Stoon Bayof, 180
P-3	Lavatory	Countritap, Enomeled cost iron, 20x17 oval Heritage pag-up Faucet	Am., Std., 3303.014 Am., Std., 2103.703
P-3A	(Hand(copped)	Scale as F-3 except eff-set trop and wrist transfer fascet	Chicaga, No.894-317
P-4	Sink	Double compartment sink 33x22 stainless steel Self-rim, Foucat w/sprny hose, Stroiner & tellplece	Elkey, LWR-3322-R Elkey, LK 2101 Elkey, LK-35
2.5	Shower	Adjustable shows head w/themogened pressure balancing valve.	Am. 5td. 1361.054
P 6	Cold Shower	Raindrep, White, Complete with 1/2" elbow, 99" chrone plated flexible home 24" slide bor, supply	Kohler, K-9654 Kohler, K-7046-7
P-7	Service Sink	Floor med , Enome had cost from, 28x28 w/ rim guard Fouces	Am, 5td. 7740,020 Am, 5td. 7745,011
		Drain	Am . Std 2953 148 Am . Std 2721 .038
P-6	Orinking Fauntain	Wall hung, Semi recessed, Vitneses chips, Bubbler with self-closing volve, 1-1/2" trap	Am Std. 8333,023
P-9	Launtary	Wall hung, 20x18 vitreous chino, Aguarten pap-up fracet	Am. Std. 0361,057 Am. Std. 2379,018
D-1	Floor Drain	Duca cost from w/politheid branza strainer, 2" outlet	J.R.Smith, 2010-8
D-7	Floor Dyain	Duca cost from, w/heavy duty top and sediment bucker 2" outlet	J.R.Smith, 2142
O5-1	OII Separator	Cast iron all interceptor, 20 GPM, Flow rate w/axent on as required.	J.E.Smith, 8320
OS-2	Oil Interceptor	Same as OS-1	
H3-1	Hose Bibb	No -freeza hase bibb branze hydront w/chrome plated foce	J.R.5mith, 5610
H#-2	Hose Sibb	Interfor hose blibb w/vocuum browker	Chicogo, 752
AH-1	Yord Hydrani	Non-freuze yord hydrant, 3/4" inlet, cast iran box, w/vocuum breeker & drain hole, Provide pea gravel for drain.	J.R.SmHh, 5810
A-1	Air Cock	Single stage pressure regulator w/shut off valve and cack	Airca, 806-9958
fST-1	Fuel Storage Tank	1,000 gallons (us) storage trak, UL approved	ACE,
F51-2	Fire) Storoge Tank	Some ox FST-1	
P-10	Sink	22 x 25 Counterpop stainless steel sink, 18 Gauge Fouces with Wrise handle Crumb cup strainer	Just, St -2225-A-G2-316 Chlcago, No. 785-P3
			Juet , J-35



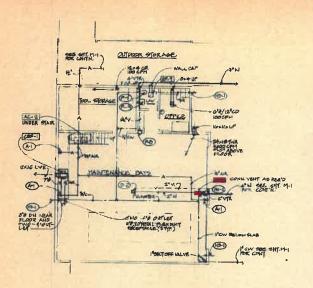
FUEL STORAGE TANK DETAIL

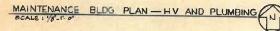


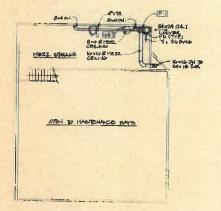
CO EXHAUST SYSTEM DETAIL



AC-1 - DETAIL

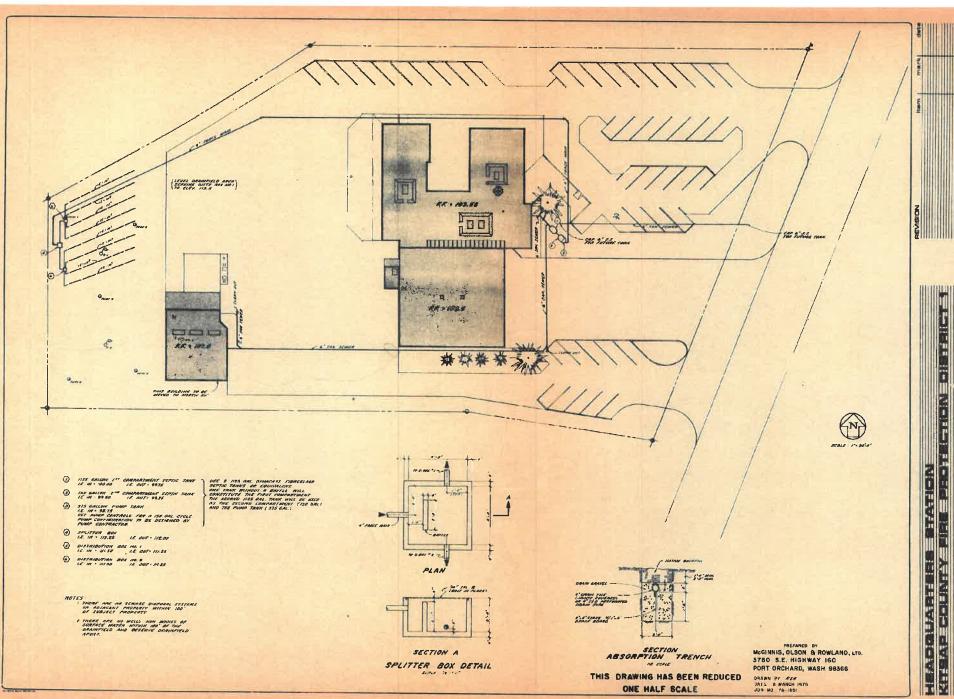






MEZZANINE FLOOR PLAN - H.V.

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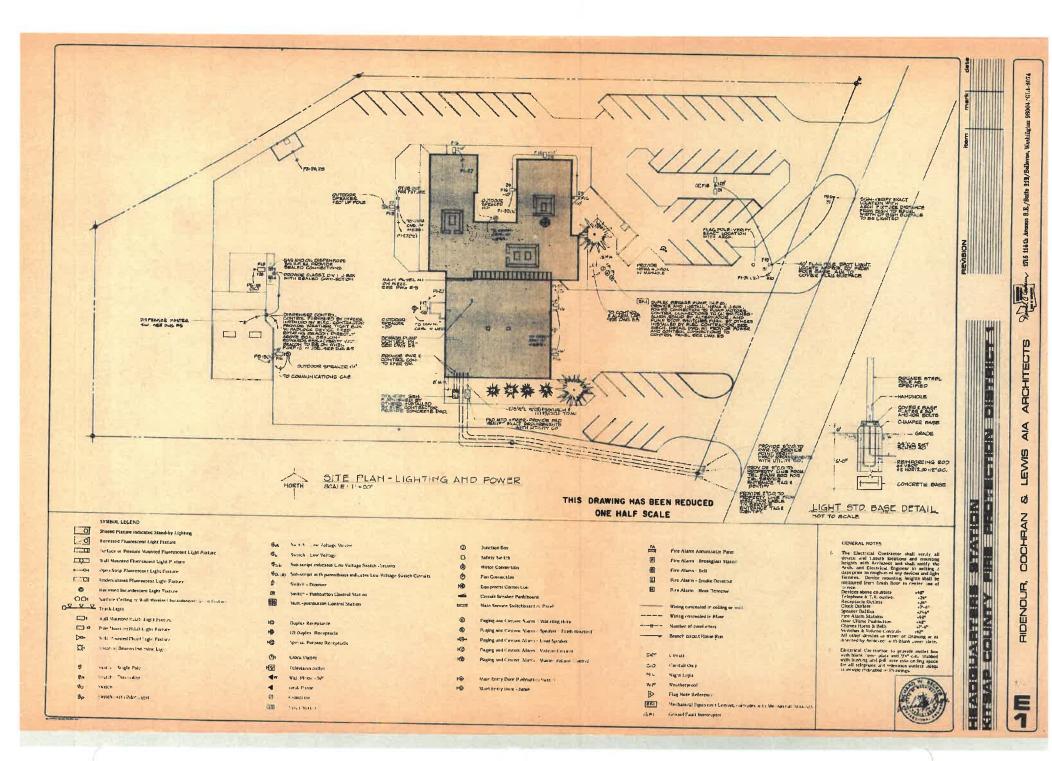
Warhington 98004, (+1,4-2074

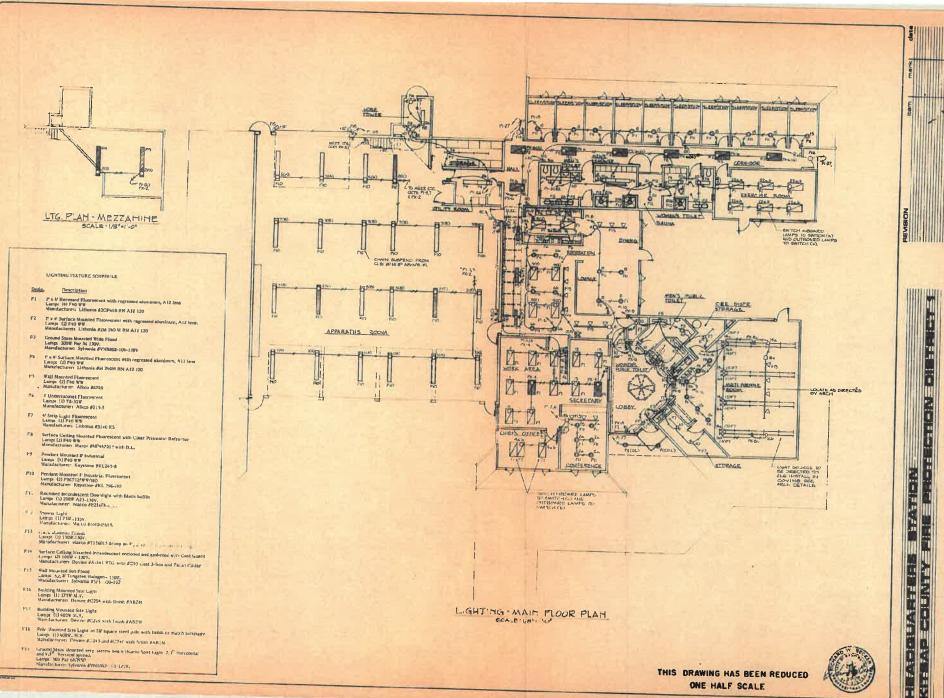
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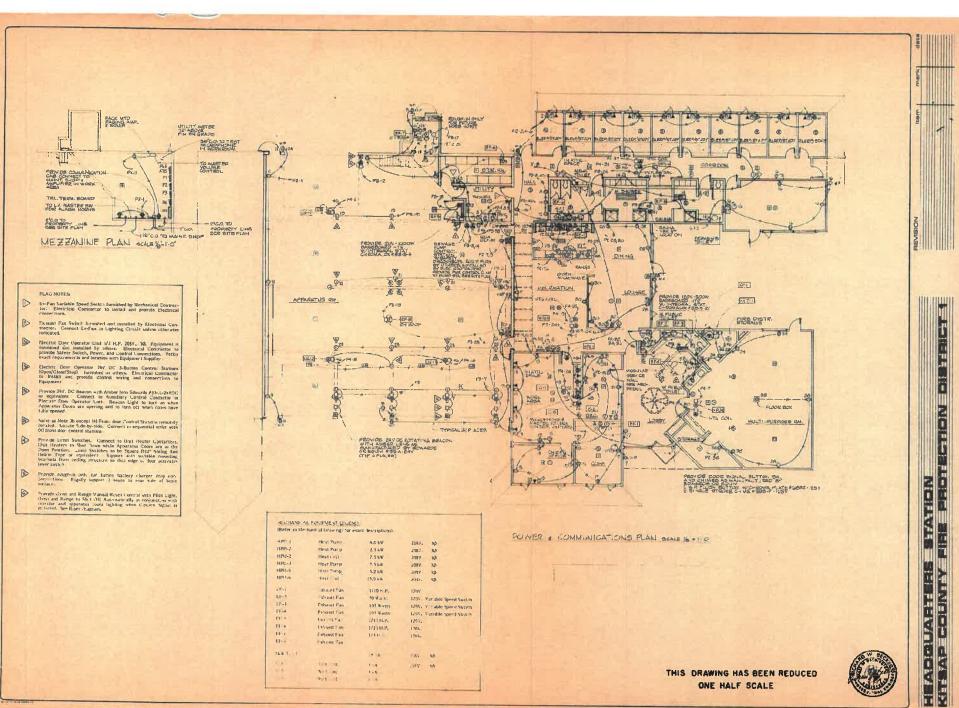
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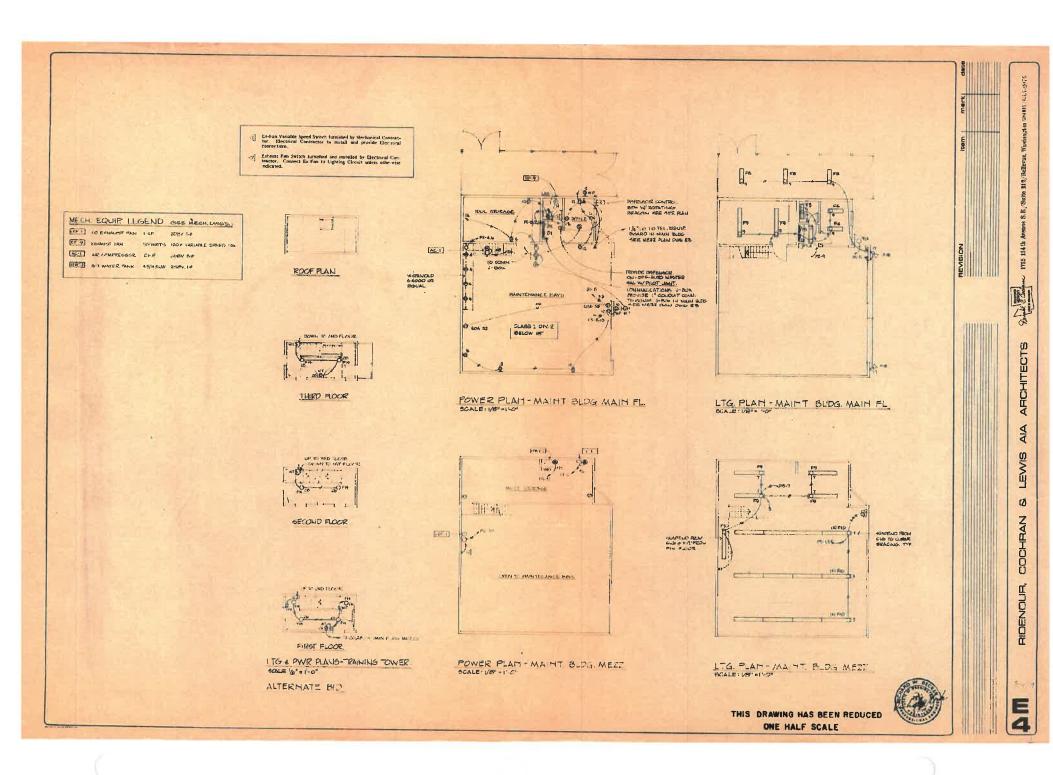


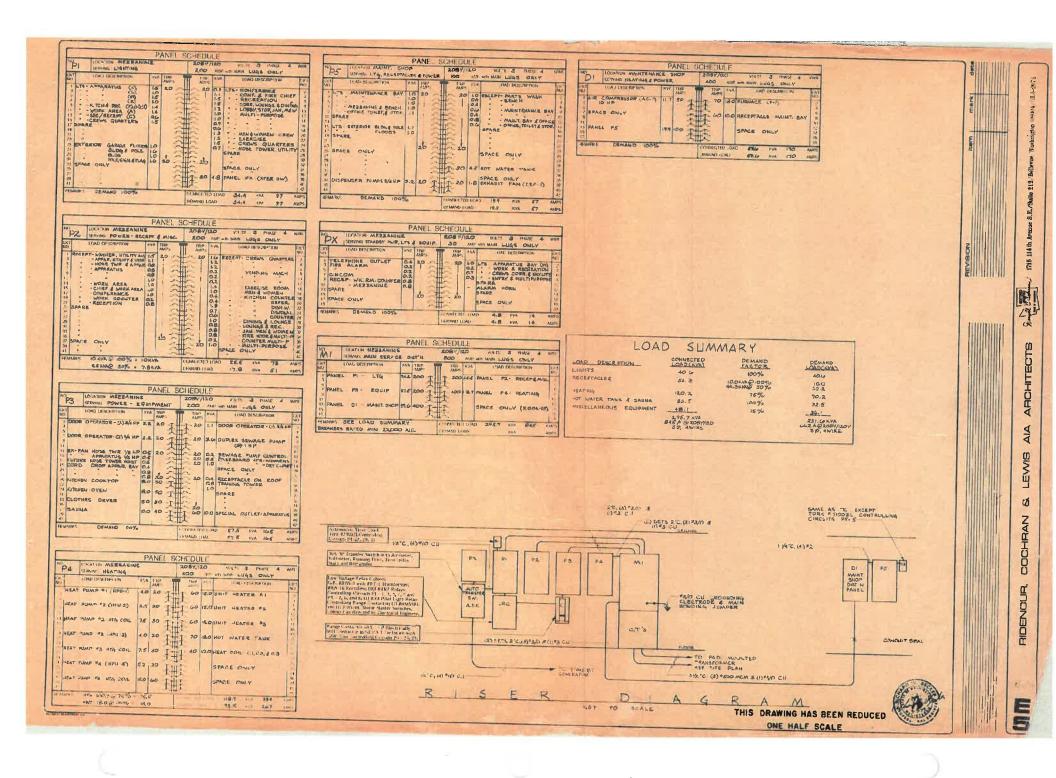
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Fire Station 52 - Olympic View / Anderson Hill

Fire Station 52 was built in 1963 on a parcel smaller than a quarter acre. At the time, Olympic View was a bustling rural community that had few organized resources for fighting fires. Neighbors banded together as volunteers and used this 1,280 square foot structure as their hub. As communities in Central Kitsap grew, the need for small volunteer stations like this disappeared. The station now houses a single fire engine that is staffed by a limited number of volunteers who respond from their home when available.



Fire Station 52 – Olympic View 15393 Olympic View Rd NW, Silverdale, WA 98383

As a result, response times for apparatus from this station are very long.

The present Fire Station 52 is a one-story masonry structure that does not meet the Immediate Occupancy performance standard after a design-level earthquake. Because of its construction type, extensive damage and failure of the lateral structural system are expected after such an event.

The parcel is not large enough to support any additions to this station, nor would it be cost effective to remodel or expand. Olympic View Road is a long dead-end road. As communities have grown up around it, road networks have improved, and full-time career firefighters have become more prevalent, this station's current location has become far from ideal.

Anticipating the eventuality of replacing Fire Station 52, in 2015 Central Kitsap Fire & Rescue purchased a parcel at the intersection of Olympic View Road and Anderson Hill Road. The parcel is approximately 2.65 acres and fronts on both streets.

Proposed Improvements

The current Fire Station 52 will become surplus and sold. The replacement station at 5328 NW Anderson Hill Road will follow the district's Prototype Station Plan; Fire Station 52 is proposed to face Olympic View Road and include both visitor and secure firefighter parking. The new Fire Station 52 will include living quarters to accommodate four firefighters, three single-deep apparatus bays, work areas, and a small public lobby. The station will be approximately 8,800 square feet in size.

The estimated construction cost for replacing this fire station would be \$6,414,675 in 2019 dollars. This amount does not include project expenses, nor inflation, which will depend on the construction start date.

End of Fire Station 52 - Olympic View / Anderson Hill



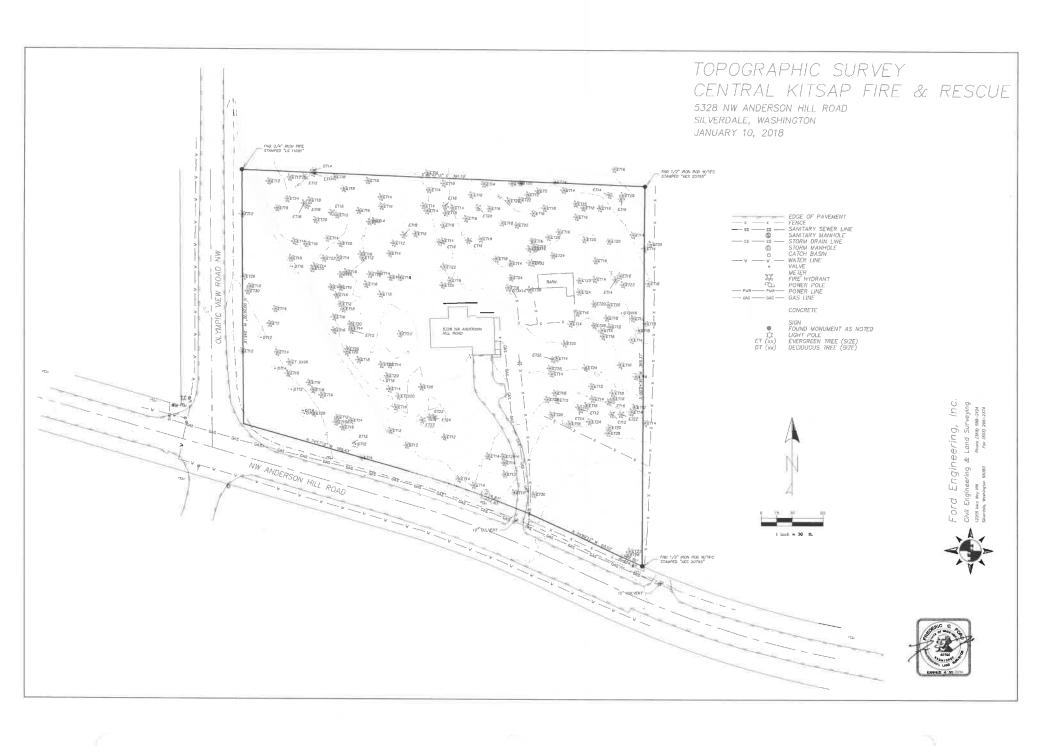


Program Requirements

Prototype Fire Station Program Requ	ii cincino	Fire	Fire	Fire	Fire	Fire
		Station	Station	Station	Station	Station
		42	45	52	53	57
	4	Island Lake	North Perry	Anderson Hill	Seabeck	Coho Run
Operations						
Apparatus Bay (3-bays, back-in)	54' x 50'	2,700	2,700	2,700	2,700	2,700
Decon	10' x 11'	110	110	110	110	110
Shop	8' x 10'	80	80	80	80	80
Clean Project Room	16' x 12'6"	200	200	200	200	200
App Bay Restroom	8' x 12'	96	96	96	96	96
Bunker Gear Storage	15' x 21'	315	315	315	315	315
General Storage	8' x 10'	80	80	80	80	80
App Bay Janitorial	8' x 8'	64	64	64	64	64
Sprinkler Riser / Compressor	6' x 10'	60	60	60	60	60
Living Quarters						
(4) Sleep Rooms	(4) 9' x 15'	540	540	540	540	540
(2) Restroom/Showers	(2) 8' x 12'	192	192	192	192	192
Kitchen	14' x 20'	280	280	280	280	280
Dining for 6	16' x 14'	224	224	224	224	224
Dayroom for 4	16' x 19'	304	304	304	304	304
Fitness	24' x 20'	480	480	480	480	480
Laundry	10' x 12'	120	120	120	120	120
Janitorial	8' x 8'	64	64	64	64	64
Public and Front of the House		=				
Public Lobby	8' x 12'	96	96	96	96	96
(1) Public Unisex Restroom	8' x 8"	64	64	64	64	64
Firefighter Work Area	18' x 20'	360	360	360	360	360
Station Officer Office	10' x 10'	100	100	100	100	100
Subtotal		6,529	5,529	6,529	6,529	6,529
Mechanical / Electrical	10%	653	653	653	653	653
Circulation	15%	979	979	979	979	979
Total Anticipated Square Fo	otage	8,161	8,161	8,161	8,161	8,161

End of Program Requirements







RICEJergusMiller

ARCHITICURE INTERIORS PLANCING VI 276 FIFTH STREET, SUITE 100 BREMERTON, WA 983\$7 380-377-8773 RFMARCH.COM

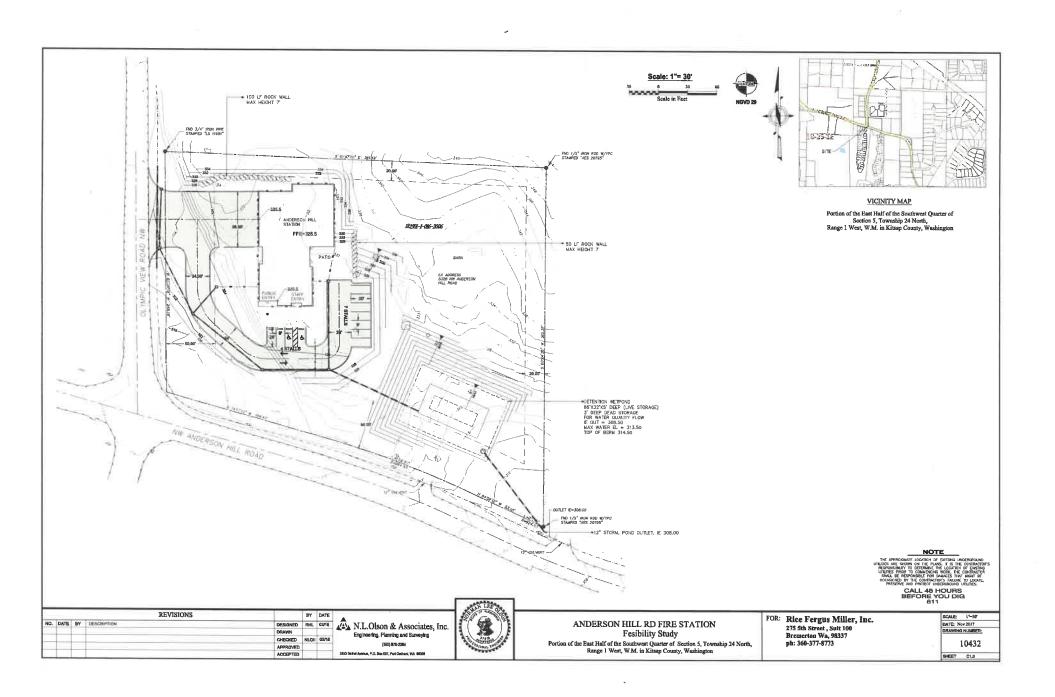
NOT FOR CONSTRUCTION

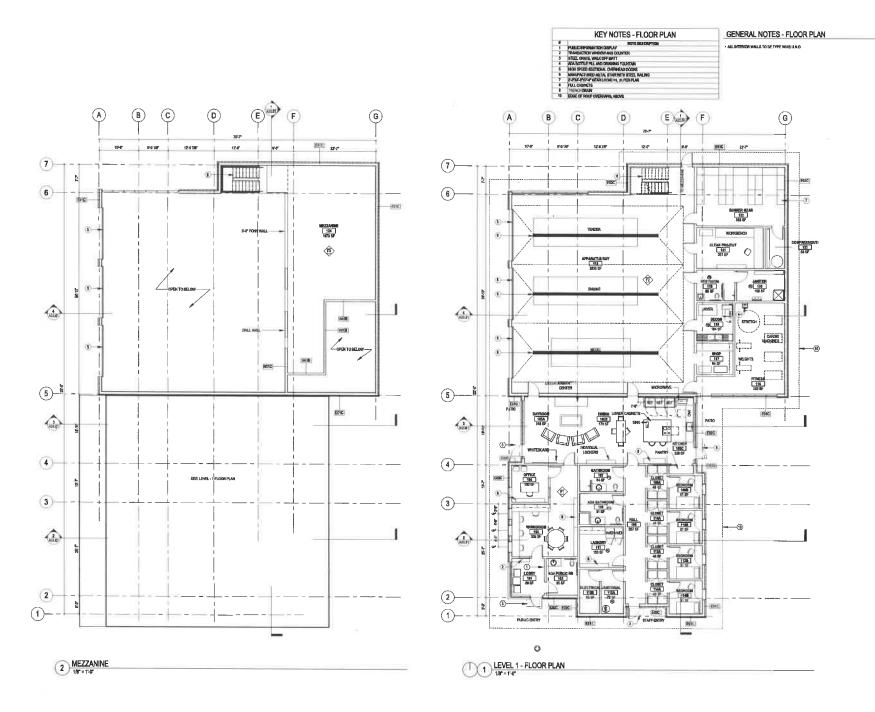
CENTRAL KITSAP FIRE & RESCUE
ANDERSON HILL STATION
5328 NW Anderson Hill Rd
Sliverdale, WA 98383

PROJECT # 2617000,00
PROJECT STATUS
GSUE DATE MAY 18, 2016
REVISION SCHOOL #

ARCHITECTURAL SITE

A10.01





RICETETSUSMILLER

275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 380-377-9773 RFMARCH.COM

NOT FOR CONSTRUCTION

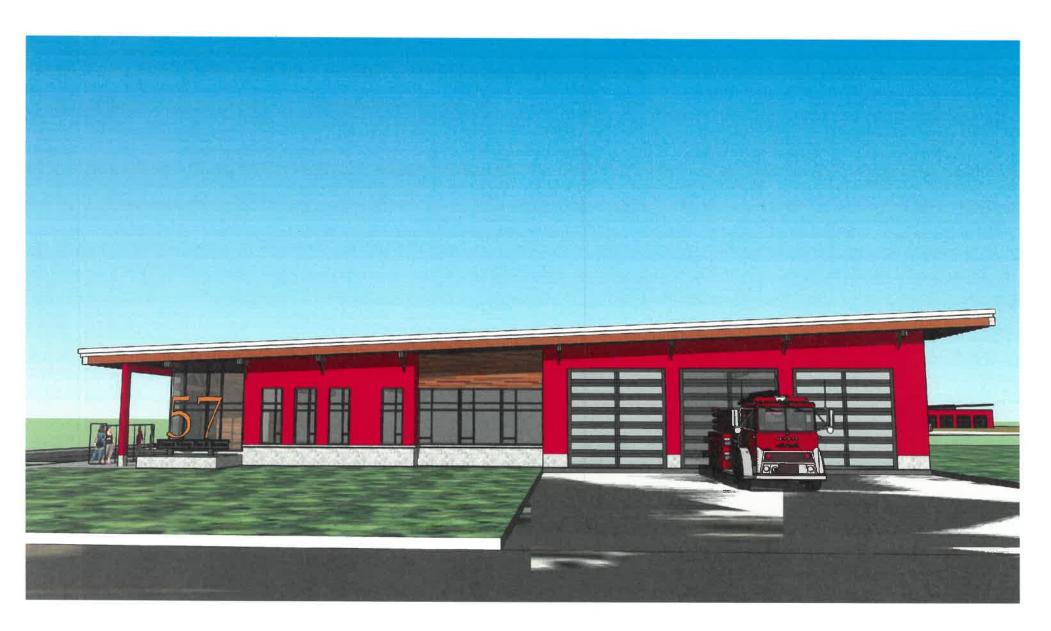
CENTRAL KITSAP FIRE & RESCUE NEW STATION: MODEL

ROJECT#	2017000.0
PR	E-DESIGN
SUE DATE	SEPTEMBER 4, 201
REVI	SHOW SICHEDUILE
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A21.11



STATION 57 (Prototype; Stations 45, 52, and 53 similar)



STATION 57 (Prototype; Stations 45, 52, and 53 similar)



Central Kitsap Fire and Rescue Bond Study 11/1/2019

Station 52-Anderson Hill

Protoypical New Bldg. Station 52 \$ 4,355,419
Site Work Station 52 \$ 1,440,445

Total direct Today's Dollars \$ 5,795,864

Exclusions:

Escalation State Sales Tax

Construction Contingency Architect/Engineering Fees

Permits

Toxic Soils/Materials Removal Construction Management Fees Utility Infrastructure to Site Piling/Special Foundations Wetland Mitigation Jurisdictional/Utility Co. Fees

Owner's Consultant Costs

Equipment & Furnishings Not Listed

Off Site Work

Builders Risk Insurance Moving/Relocation Expense

Alternative Delivery-GC/CM, Design-Build

Legal Expense

Land Purchase/Financing Costs

Fire Vehicles/Apparatus/Radio Towers

Project/Bid Market/Code Change Contingency



Prototypical New Building Summary

Gross Floor Area: 8,800 SF Rates Current At September 2019

Desc	ription	Cost/SF	Total Cost
140		* 27.00	* 0.40.00 7
A10	Foundations	\$27.38	\$240,907
B10	Superstructure	\$39.75	\$349,760
B20	Exterior Enclosure	\$78.60	\$691,695
B30	Roofing	\$34.62	\$304,670
C10	Interior Construction	\$27.62	\$243,086
C20	Stairs	\$2.84	\$25,000
C30	Interior Finishes	\$23.51	\$206,887
D20	Plumbing	\$34.00	\$299,200
D30	HVAC	\$43.00	\$378,400
D40	Fire Protection	\$6.80	\$59,840
D50	Electrical	\$43.50	\$382,800
E10	Equipment	\$7.88	\$69,355
E20	Furnishings	\$12.49	\$109,898
Z10	General Conditions	\$48.30	\$425,000
		ESTIMATED NET COST \$430.28	\$3,786,498
MAR	GINS & ADJUSTMENTS		
Desig	gn Contingency-Building	7.0 %	\$265,055
1	actors Overhead & Profit	7.5 %	\$303,866
		ESTIMATED TOTAL COST \$494.93	\$4,355,419

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
A1010	Standard Foundations				
1	Standard foundation excavation,backfill,haul off	SF	8,800	1.50	13,200
2	Footing drains w/gravel	LF	415	20.00	8,300
3	Add for lateral system footings	EA	4	2,500.00	10,000
4	Continuous footings at exterior	CY	30	550.00	16,665
5	Continuous footings interior	CY	8	550.00	4,180
6	Column footing allowance	CY	34	460.00	15,824
8	Stem walls	SF	1,225	46.00	56,350
9	Waterproofing foundation	SF	1,415	5.85	8,278
	Standard Foundations			\$15.09/SF	\$132,797
A1030	Slab on Grade				
10	Gravel at slab on grade	SF	8,800	0.70	6,160
11	Trench drains @ App bay	LF	103	185.00	19,055
12	8" slab on grade-App Bay	SF	2,830	8.50	24,055
13	4" slab on grade-balance of bldg.	SF	5,970	6.35	37,910
14	Rebar at 8" slab-#5 @ 14" O.C.	Lb	5,822	1.70	9,897
15	Slab depressions, block-outs and columns closures	SF	8,800	0.40	3,520
16	Rigid insulation @ slab perimeter	SF	1,038	3.00	3,113
17	Vapor retarder @ slab	SF	8,800	0.50	4,400
	Slab on Grade			\$12.29/SF	\$108,110
B1020	Roof Construction				
20	Gang nail truss, TJI, plywood roof structure	SF	10,930	32.00	349,760
24	Fireproofing at roof structure	LS	1		Excl
	Roof Construction			\$39.75/SF	\$349,760
B2010	Exterior Walls				
27	Ext wall frame @ openings, glazing areas	SF	2,307	8.00	18,456
28	Exterior wall framing system-insul,sheath,gwb,wrb,clips	SF	6,319	30.35	191,782
29	Misc. flash,trim,seal,caulk exterior wall envelope and screens	SF	8,626	2.65	22,859
30	Red Fiber Cement Siding	SF	2,636	24.00	63,264
31	Wood siding	SF	2,044	24.00	49,056
32	Precast-base perimeter & public entry	SF	1,639	52.00	85,228
279	Ext. signage	LS	1	25,000.00	25,000
	Exterior Walls			\$51.78/SF	\$455,645

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
B2020	Exterior Windows				
35	Ext. glazing systems	SF	1,614	75.00	121,050
	Exterior Windows			\$13.76/SF	\$121,050
B2030	Exterior Doors				
36	High speed overhead sectional doors	EA	3	30,000.00	90,000
39	Exterior doors/frames/hardware-per leaf	EA	5	3,000.00	15,000
40	Misc. exterior door hardware/card/electric	LS	1	10,000.00	10,000
	Exterior Doors			\$13.07/SF	\$115,000
B3010	Roof Coverings				
44	Membrane roofing system	SF	10,930	18.35	200,566
45	Roofing rough carpentry	SF	10,930	0.65	7,105
46	Roof flashing,coping,sheet metal,	SF	10,930	2.05	22,407
47	Fall protection system	SF	10,930	1.00	10,930
48	Misc roofing accessories, hatch, walkpads, ladders	SF	10,930	0.55	6,012
49	Cladding/work at overhangs	SF	2,130	20.00	42,600
264	Metal caps at roof beams	EA	86	175.00	15,050
	Roof Coverings			\$34.62/SF	\$304,670
C1010	Partitions				
50	Interior partitions	SF	10,095	13.55	136,790
52	Add for interior partition types,ratings	SF	6,562	3.50	22,966
266	Drill Wall/pony wall	SF	162	25.00	4,050
280	Transaction window and int. relite allowance	LS	1	5,000.00	5,000
	Partitions			\$19.18/SF	\$168,806
C1020	Interior Doors				
53	Pocket door	EA	1	2,100.00	2,100
55	Int. HM door/frame/hdwre-per leaf	EA	23	2,000.00	46,000
57	Misc. door hardware/ratings/readers	LS	1	5,500.00	5,500
	Interior Doors			\$6.09/SF	\$53,600
C1030	Specialties				
58	Specialties allowance	SF	8,800	2.35	20,680
	Specialties			\$2.35/SF	\$20,680
C2010	Stair Construction				
274	Stair/rails to mezzanine	LS	1	25,000.00	25,000
	Stair Construction			\$2.84/SF	\$25,000



Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
C3010	Wall Finishes				
60	Interior Painting/sealing	SF	8,800	3.55	31,240
61	Wall protection at apparatus bay walls 8'	SF	1,040	12.00	12,480
62	Ceramic tile wall restrooms/showers	SF	1,485	22.00	32,670
63	Epoxy wall coating at decon and wash alcove-allow 8'	SF	328	16.00	5,248
281	Plam wall janitor rooms	SF	612	9.00	5,508
	Wall Finishes			\$9.90/SF	\$87,146
C3020	Floor Finishes				
66	Floor grates	LS	1	2,500.00	2,500
67	Athletic flooring-fitness room	SF	391	12.00	4,688
68	Polished concrete flooring	SF	7,867	7.50	59,006
69	Epoxy flooring-decon and wash alcove room-allow	SF	192	16.00	3,072
71	Rubber base allowance	SF	8,800	0.40	3,520
72	Ceramic tile base	LF	125	22.00	2,750
268	Ceramic tile flooring	SF	349	22.00	7,671
	Floor Finishes			\$9.46/SF	\$83,207
C3030	Ceiling Finishes				
73	ACT ceilings @ sleep rooms	SF	394	6.50	2,561
74	GWB ceilings-at restrooms/showers	SF	349	12.00	4,188
75	Acoustical cloud @ dayroom	SF	496	30.00	14,880
76	Ceilings-open to structure/seal-paint	SF	8,057	1.85	14,905
	Ceiling Finishes			\$4.15/SF	\$36,534
D2010	Plumbing Fixtures				
77	Plumbing allowance	SF	8,800	34.00	299,200
	Plumbing Fixtures			\$34.00/SF	\$299,200
D3090	Other HVAC Systems and Equipment				
78	HVAC allowance	SF	8,800	43.00	378,400
	Other HVAC Systems and Equipment			\$43.00/SF	\$378,400
D4040	Sprinklers				
79	Fire protection-allowance	SF	8,800	6.80	59,840
	Sprinklers			\$6.80/SF	\$59,840
D5090	Other Electrical Services				
80	Building electrical-allowance	SF	8,800	43.50	382,800
	Other Electrical Services				

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CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for: Rice Fergus Miller Architecture



Prepared by:

Corbin M. Hammer, P.E., S.E. Principal Engineer

Katherine R. Brawner, P.E. Project Engineer

ReidMiddleton

728 134th Street SW, Suite 200 Everett, WA 98204 425-741-3800 File No. 262019.052

3.5 Fire Station 52

3.5.1 Building Description

Year Built:

Floor Area:

1963

Number of Stories:

stories: 1

1,270 SF

Address:

15393 Olympic

View Road NW,

Silverdale, WA



Fire Station 52, known as the Olympic View Community Fire Station, is one-story masonry structure, built on relatively flat ground. The 1963 building is rectangular in plan, measuring approximately 40 feet by 32 feet with an approximate roof height of 14 feet. Building construction consists of masonry walls supporting wood roof trusses. Fire Station 52 serves as a volunteer fire station for Central Kitsap Fire and Rescue and houses one engine.

Structural System

Table 3.5-1. Structural System Description of Fire Station 52.

Structural System	Description
Roof	Plywood sheathing is supported by wood trusses supported by masonry exterior walls and interior beams and columns.
Floor	Drawings are not available. The floor is anticipated to be composed of a reinforced slab on grade.
Foundations	Drawings are not available. The masonry walls are anticipated to be supported by continuous concrete spread footings.
Hose Tower	N/A.
Lateral System	Reinforced masonry perimeter shear walls resist the forces in the longitudinal and transverse directions.

3.5.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.5-2. Identified Seismic Deficiencies for Fire Station 52.

Deficiency	Description
Redundancy	Shear walls are not present at the front of the apparatus bay. Without multiple lines of resistance, increased lateral loads can be applied to seismic elements beyond which they were originally designed for.
Reinforcing Steel	Record drawings are not available, but walls are not anticipated to meet minimum reinforcing requirements. Selective demolition is required to verify this condition. Inadequate reinforcing steel in walls results in decreased capacity to resist seismic forces.
Wall Anchorage	Record drawings are not available, but it is anticipated that wall anchorage does not have adequate strength to resist seismic forces. Separation at the wall can cause partial or complete collapse of a structure and also presents a falling hazard.

building be replaced to meet the IO performance objective. Upgrading the existing building is also an option; however, with the combination of deficiencies and the expectancy that the existing building does not address current programming and planning needs, a replacement may better suit the fire district's residents and the fire district.

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			X	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
			X	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	·
			X	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	Record drawings are not available but check is anticipated to be not applicable as foundations are anticipated to be grade beams.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Stiff Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	
		х		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.3)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT	
		Х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	Record drawings are not available but check is anticipated to be not applicable and strip footings present.	
		X SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: Sec. A.6.2.4)		depth from one side of the building to another does not exceed		

Low, Moderate, and High Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Tier 2: Sec. 5.5.3.1.5; Commentary: Sec. A.3.2.4.3)	Record drawings are not available but check is anticipated to be compliant.
X				PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30. (Tier 2: Sec. 5.5.3.1.2; Commentary: Sec. A.3.2.4.4)	

Diaphragms (Stiff or Flexible)

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		X OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)		immediately adjacent to the shear walls are less than 15% of the	
		X OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)		Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec.	
		X PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)		locations of plan irregularities. (Tier 2: Sec. 5.6.1.4;	



N.L. OLSON & ASSOCIATES, INC. Engineering, Planning & Land Surveying

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Port Orchard, WA 98366
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www.nlolson.com

TECHNICAL MEMORANDUM PROJECT STORM DRAINGE ANALYSIS

Project: Central Kitsap Fire, Anderson Hill Fire Station

To: Rice Fergus Miller, Attn: Howard Struve Subject: Stormwater Management System

Date: August 14, 2018

This Technical Memorandum (TM) summarizes the storm drainage analysis and design for the feasibility study requested by RFM for the fire station located on Anderson Hill rd. The following parameters are the bases for the pond sizing, water quality mitigation and the conveyance systems. Based on the geotechnical report infiltration is not considered feasible, consequently a detention/wetpond is proposed. The WWHM 2012 continuous flow model program with a Quilcene 0.8 rain gauge is used for analysis.

Based on the site plan of the proposed project the following areas are used for analysis: *All areas are approximate.

- Total disturbed area is 87,000 sf (2.0 ac).
- Impervious area is 23,000 sf (0.53 ac).
- Landscaped area is 50,100 sf (1.17 ac).
- Captured forest area is 8,900 sf (0.20 ac).

The pond size needed for flow control requirements, and passing duration test, measures 65' long, 35, wide and 5' deep. The proposed wet pond is 3' deep and below the live storage volume of the detention pond. Discharge is to the existing drainage way located in the southeast corner of the site. The pond and associated grading require approximately 15,000 sf of space for placement, and an excavation of approximately 1,200 cy of material.

Site Sanitary Sewer						
Pump System (by others)	1	allowance	\$ 20,000.00	\$	20,000.00	
Sub-Total						\$ 20,000.00
Erosion Control						
filter fence	1000	lf	\$ 6.00	\$	6,000.00	
quarry spall entrance	1	ea	\$ 4,000.00	\$	4,000.00	
sediment trap rock	10	tons	\$ 25.00	\$	250.00	
ditches	700	If	\$ 1.00	\$	700.00	
hydroseeding	1.3	acres	\$ 4,000.00	\$	5,200.00	
Sub-Total						\$ 16,150.00
Miscellaneous						
fencina	300	If	\$ 50.00	\$	15,000.00	
misc traffic control	2	allowance	\$ 2,000.00	\$	4,000.00	
dry utility trench	200	If	\$ 22.00	\$	4,400.00	
landscaping	1	allowance	\$ 20,000.00	\$	20,000.00	
signage	1	allowance	\$ 4,000.00	\$	4,000.00	
Sub-Total				_		\$ 47,400.00
Overhead & Profit	10%	%	\$511,810.00	\$	51,181.00	
Sub-Total						\$ 51,181.00
Sales Tax 8.9%	8.9%	%	\$562,991.00	\$	50,106.20	
Sub-Total				_		\$ 50,106.20
TOTAL					\$613,097.20	\$ 613,097.20
Does not include:						
Utility Connection Costs						
Impact Fees						
Permit Fees						
Enginerring & Survey						



Geotechnical Investigation
Proposed Anderson Hill Fire Station

53xx NW Anderson Hill Road Silverdale, Washington

April 16, 2018

1.0 Introduction

In accordance with your authorization, Cobalt Geosciences, LLC (Cobalt) has completed a geotechnical investigation for the proposed Anderson Hill Fire Station located northeast of the intersection between NW Anderson Hill Road and Olympic View Road NW in Silverdale, Washington (Figure 1).

The purpose of the geotechnical investigation was to identify subsurface conditions and to provide geotechnical recommendations for foundation design, retaining walls, earthwork, soil compaction, utilities, stormwater management, and suitability of the on-site soils for use as fill.

The scope of work for the geotechnical investigation consisted of a site investigation followed by engineering analyses to prepare this report. Recommendations presented herein pertain to various geotechnical aspects of the proposed development, including foundation design, drainage, and earthwork.

2.0 Project Description

The project includes construction of a new Fire Station building, access roadways, stormwater management infrastructure, and concrete retaining walls. The new building will be located in the northwest-central portion of the property with access and parking located west and south of the building.

We anticipate that foundation loads will be moderate and that site grading will include cuts and fills on the order of 10 feet or less for foundation placement, retaining walls, and detention vault/pond construction. We should be provided with the final plans in order to update our recommendations, if necessary.

3.0 Site Description

The site is located northeast of the intersection between NW Anderson Hill Road and Olympic View Road NW in Silverdale, Washington (Figure 1). The property consists of one irregularly shaped parcel (No. 18250110162006) with a total area of about 2.65 acres.

The site is currently developed with a single-family residence and accessory buildings. These buildings are located in the north-central portion of the property with a gravel driveway extending to the area from the south. The remainder of the property is currently undeveloped and vegetated with grasses, ferns, laurels, Salal, along with variable diameter Fir and Madrone trees.

The site slopes in multiple directions with an overall gradient extending downward toward the south and southwest. Natural slopes have magnitudes of 5 to 35 percent. The overall topographic relief across the property is approximately 42 feet.

There are many areas that appear to have been historically graded. These areas are located just east and north of the residence, and within the west and southwest portions of the property. Graded slopes up to 1H:1V in magnitude with topographic relief of up to 15 feet are present at some locations. There is a large nearly level area in the southwest and west portions of the property. This may have been used historically as a roadway (Olympic View Road NW).

April 16, 2018

Test Pit TP-5

Test Pit TP-5 encountered about 8 inches of topsoil and vegetation underlain by approximately 10 inches of medium dense to dense, gravel with sand (Fill). This layer was underlain by dense to very dense, silty-fine to medium grained sand with gravel (Glacial Till), which continued to the termination depth of the test pit.

Test Pits TP-6 and TP-7

These test pits encountered 4 to 6 inches of topsoil and vegetation underlain by approximately 12 inches of loose to medium dense, silty-fine to medium grained sand with gravel (Weathered Glacial Till, possible Fill?). This layer was underlain by dense to very dense, silty-fine to medium grained sand with gravel (Glacial Till), which continued to the termination depth of the test pits.

5.1.2 Groundwater

Groundwater was not encountered during our investigation. We anticipate that light amounts of perched groundwater may develop during the wet season (winter-spring) between the weathered glacial till and the underlying unweathered glacial till. Soil mottling was observed in the upper two to three feet in most of the test pits.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project.

6.0 Geologic Hazards

6.1 Steep Slope Hazard

The site has graded slopes with magnitudes of up to 100 percent and relief of about 15 feet. These areas are located north and east of the existing residence and in the southwest-west portions of the property. Natural slopes within the site do not have magnitudes consistent with steep slope hazard areas.

The site is underlain by glacial till which is resistant to landslide activity at magnitudes of about 100 percent or less. It is our opinion that the man-made steep slope areas are stable at this time. We anticipate that the proposed grading and wall construction activities will remove or alter these areas in a manner that will result in additional stability. In other words, the proposed construction will increase the stability of previously graded steep slope areas by lowering slope magnitudes and wall construction.

6.2 Erosion Hazard

The <u>Natural Resources Conservation Services</u> (NRCS) maps for Kitsap County indicate that the site is underlain by Alderwood gravelly sandy loam (8-30 percent slopes). These soils have a "Slight" to "Moderate" erosion potential in a disturbed state.

April 16, 2018

8.0 Recommendations

8.1.1 Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil. Based on observations from the site investigation program, it is anticipated that the stripping depth will range from 6 to 18 inches. Deeper excavations should be expected below larger diameter trees and where undocumented fill is present.

The excavated material is not suitable as fill material within the proposed building envelope but could be used as fill material in non-settlement sensitive areas such as landscaping regions. In these non-settlement sensitive areas, the fill should be placed in maximum 12 inch thick lifts that should be compacted to at least 90 percent of the modified proctor (ASTM D 1557 Test Method) maximum dry density.

The native soils below the vegetation and topsoil consist of glacial till. These materials are generally considered suitable for use as structural fill provided they are within 3 percent of the optimum moisture content. It should be noted that glacial till soil materials are typically suitable for structural fill during the summer months only if they can be dried to optimum moisture levels.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

8.1.2 Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 10 feet or less for foundation placement. These excavations should be sloped no steeper than 1H:1V (Horizontal:Vertical) in weathered native soils (medium dense to dense) and 3/4H:1V in unweathered glacial till (dense to very dense). If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 1.5H: 1V, where room permits.

Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

April 16, 2018

8.1.4 Foundation Design

The proposed fire station building and free-standing concrete retaining walls may be supported on shallow spread footing foundation systems bearing on undisturbed medium dense or firmer native soils, re-compacted native soils, or on properly compacted structural fill placed on the suitable native soils. If structural fill is used to support foundations, then the zone of structural fill should extend beyond the faces of the footing a lateral distance at least equal to the thickness of the structural fill.

Any footings located near or on any slope greater than 30 percent magnitude should be embedded to a depth in order to create a minimum effective setback of at least 5 feet as measured from the face of the footing horizontally to the face of the adjacent slope.

For shallow foundation support, we recommend widths of at least 18 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 3,000 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings, should be less than ½ inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.40 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 275 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas). The allowable friction factor and allowable equivalent fluid passive pressure values include a factor of safety of 1.5. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A 1/3 increase in the above values may be used for short duration transient loads.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.

April 16, 2018

We recommend that the backfill be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. In place density tests should be performed to verify adequate compaction. Soil compactors place transient surcharges on the backfill. Consequently, only light hand operated equipment is recommended within 3 feet of walls so that excessive stress is not imposed on the walls.

8.1.6 Stormwater Management

The site is underlain by weathered and unweathered glacial till which is nearly impermeable and not conducive to infiltration of stormwater runoff. We conducted a small-scale pilot infiltration test (PIT) in Test Pit TP-7 at a depth of 3 feet below grade. Following a saturation period, the measured infiltration rate was approximately 0.2 inches per hour. This is below what the Department of Ecology considers to be feasible for infiltration (0.3 inches per hour).

We anticipate that stormwater will be managed through the use of one or more below-grade vaults or a large detention pond. Vaults may be located in many areas of the site. We understand that a detention pond may be located in the southwest corner of the property, which is lower in elevation than a majority of the property.

We can provide recommendations for detention pond or vault construction once more details become available.

8.1.7 Slab-on-Grade

We recommend that the upper 12 inches of the existing soils within any proposed slab areas be recompacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method).

Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 210 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined in

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4 inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from these buildings and preferably with a relatively impermeable surface cover immediately adjacent to the buildings.

April 16, 2018

The recommended flexible and rigid pavement sections are based on design CBR and modulus of subgrade reaction (k) values that are achieved, only following proper subgrade preparation. It should be noted that subgrade soils that have relatively high silt contents will likely be highly sensitive to moisture conditions. The subgrade strength and performance characteristics of a silty subgrade material may be dramatically reduced if this material becomes wet.

Based on our knowledge of the proposed project, we expect the traffic to range from light duty (passenger automobiles) to heavy duty (fire trucks). The following tables show the recommended pavement sections for light duty and heavy duty use.

ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT

LIGHT DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **		
2.5 in.	6.0 in.	12.0 in.		

^{* 95%} compaction based on ASTM Test Method D1557
**A proof roll may be performed in lieu of in place density tests

HEAVY DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **		
4.0 in.	6.0 in.	12.0 in.		

^{* 95%} compaction based on ASTM Test Method D1557

** A proof roll may be performed in lieu of in place density tests

PORTLAND CEMENT CONCRETE (RIGID) PAVEMENT

Min. PCC Depth	Aggregate Base*	Compacted Subgrade* **		
6.0 in.	6.0 in.	12.0 in.		

^{* 95%} compaction based on ASTM Test Method D1557
**A proof roll may be performed in lieu of in place density tests

The asphaltic concrete depth in the flexible pavement tables should be a surface course type asphalt, such as Washington Department of Transportation (WSDOT) ½ inch HMA. The rigid pavement design is based on a Portland Cement Concrete (PCC) mix that has a 28-day compressive strength of 4,000 pounds per square inch (psi). The design is also based on a concrete flexural strength or modulus of rupture of 550 psi

GEOTECHNICAL INVESTIGATION SILVERDALE, WASHINGTON

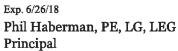
April 16, 2018

Respectfully submitted,

Cobalt Geosciences, LLC

Original signed by:





PH/sc



Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

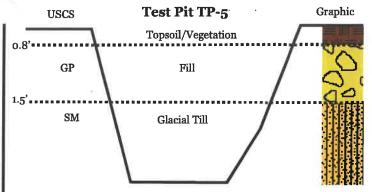


Proposed Anderson Hill Fire Station 53xx NW Anderson Hill Road Silverdale, Washington VICINITY MAP
FIGURE 1



P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 cobaltgeo@gmail.com

APPENDIX CTest Pit Logs & Sieve Analyses



o-o.8' Vegetation/Topsoil

o.8-1.5' Poorly Graded Gravel with Sand (GP)

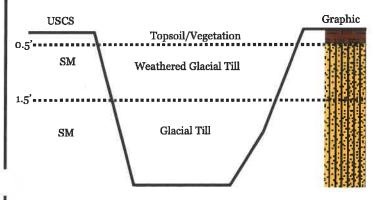
Medium dense to dense, fine to medium grained gravel with sand, yellowish brown, moist.

(Fill)

1.5-4' Silty Sand with Gravel (SM)
Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

End of Test Pit 4' No Groundwater No Caving

Test Pit TP-6



o-o.5' Vegetation/Topsoil

o.5-1.5' Silty Sand with Gravel (SM)

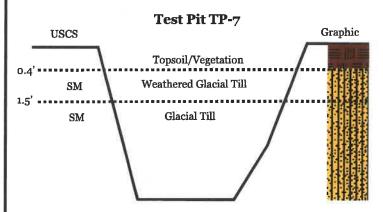
Loose to medium dense, silty-fine to medium grained sand with gravel, mottled yellowish brown to grayish brown, moist.

(Weathered Glacial Till)

1.5-5.5' Silty Sand with Gravel (SM)

Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

End of Test Pit 5.5' No Groundwater No Caving



o-o.4' Vegetation/Topsoil

0.4-1.5' Silty Sand with Gravel (SM)

Medium dense, silty-fine to medium grained sand with
gravel, mottled yellowish brown to grayish brown, moist.
(Weathered Glacial Till)

1.5-5' Silty Sand with Gravel (SM) Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

End of Test Pit 5' No Groundwater No Caving





Boring No:

Sieve Analysis Data Sheet

ASTM D422-63(2007)

Anderson Hill Fire Station **Tested By:** PΗ **Project Name:** Date: 4/2/2018

Location: 53xx NW Anderson Hill Road Checked By: SC 4/5/2018 Date: **Test Number:**

1

Sample Depth: Gnd Elev.:

USCS Soil Classification:

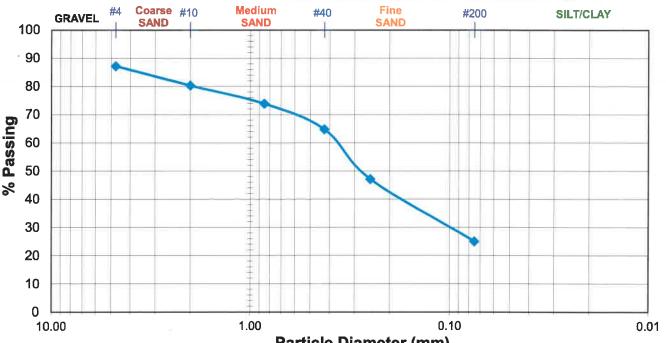
AASHTO Soil Classification:

TP-5

Weight of Container (g): Weight of Container & Soil (g): 78.0

Weight of Dry Sample (g):

Sieve Number	Diameter (mm)	Mass of Sieve (g)	Mass of Sieve & Soil (g)	Soil Retained (g)	Soil Retained (%)	Soil Passing (%)	
#4	4.75	10	17.6	7.6	12.8	87.2	
#10	2.00	10	14.1	4.1	6.9	80.3	
#20	0.85	10	13.83	3.8	6.4	73.9	
#40	0.43	10	15.4	5.4	9.1	64.8	
#60	0.25	10	20.5	10.5	17.7	47.1	
#200	0.075	10	23.1	13.1	22.1	25.0	
Pan		10	24.8	14.8	24.9	0.0	
			TOTAL:	59.33	99.9		



Particle Diameter (mm)

Grain Size Distribution Curve Results:

% Gravel: 62.2 % Sand: % Fines:

11% moisture



Fire Station 53 - Seabeck Community

Fire Station 53 was built in 1963 on a parcel less than a half-acre in size. At the time, Seabeck was a busy and active community on the shore of Hood Canal. Community members organized firefighting efforts out of this 2,120 square foot station. Since then, growth in the greater Seabeck community has exceeded Fire Station 53's capacity. The station currently accommodates one fire engine, a tender, and an Aid vehicle. Because Fire Station 53 does not have any



Fire Station 53 – Seabeck Community 15543 Seabeck Hwy NW, Seabeck, WA 98380

living quarters, it can only be staffed during daytime hours. Calls for service at night and during the evening are dispatched to volunteers who respond from their homes, if available. As a result, response times at night and during the evening from this station are very long.

The present Fire Station 53 is a one-story masonry structure that does not meet the Immediate Occupancy performance standard after a design-level earthquake. Of particular concern is the masonry hose tower which poses a serious falling hazard and could cause significant damage to the building and occupants.

Additions and remodeling to this station is not considered cost effective given its age and construction type. In addition to cost ineffectiveness, the small parcel size would significantly limit any proposed additions to the building. For these reasons, Central Kitsap Fire & Rescue has been actively exploring options for replacing this station in an alternative location.

In 2019, CKFR began discussions with Central Kitsap School District about building a new fire station on the former Seabeck Elementary School site, which is adjacent to the fire district's Fire Station 53 property. Discussions are ongoing. Both agencies are interested in how the property could eventually be developed into a community campus with a fire station, community gymnasium, community athletic fields, and a small community school.

Proposed Improvements

For purposes of this Capital Facilities Plan, it is proposed that a replacement Fire Station 53 be constructed in the former baseball field area of the school district's Seabeck property. This replacement station would follow the District's Prototype Plan. The future of the current Fire Station 53 is undecided at this time but would likely be made surplus and sold.



The new Fire Station 53 would include living quarters for 4 firefighters, 3 single deep apparatus bays, work areas, and a small public lobby. The station would be approximately 8,800 square feet in size.

Construction costs for the fire district's Prototype Station Plan have been estimated at approximately \$4,974,230.00. Site improvements for the station on the school district's former ballfield will be extensive and are projected to be an additional \$1,400,000.00 for a total estimated constriction cost for Station 53 to be \$6,374,230.00.

End of Fire Station 53 - Seabeck Community



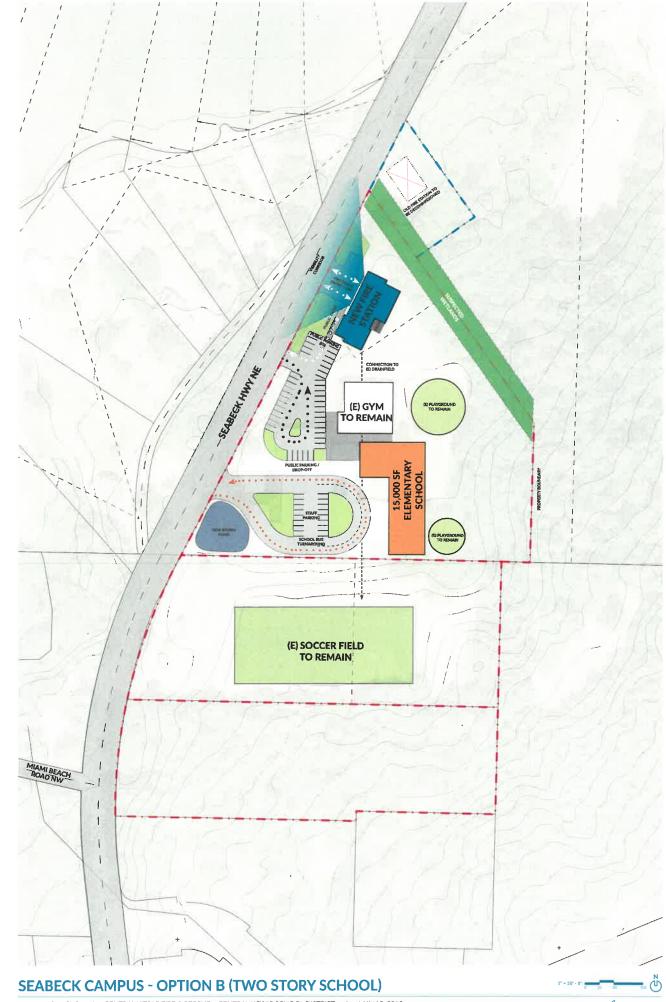


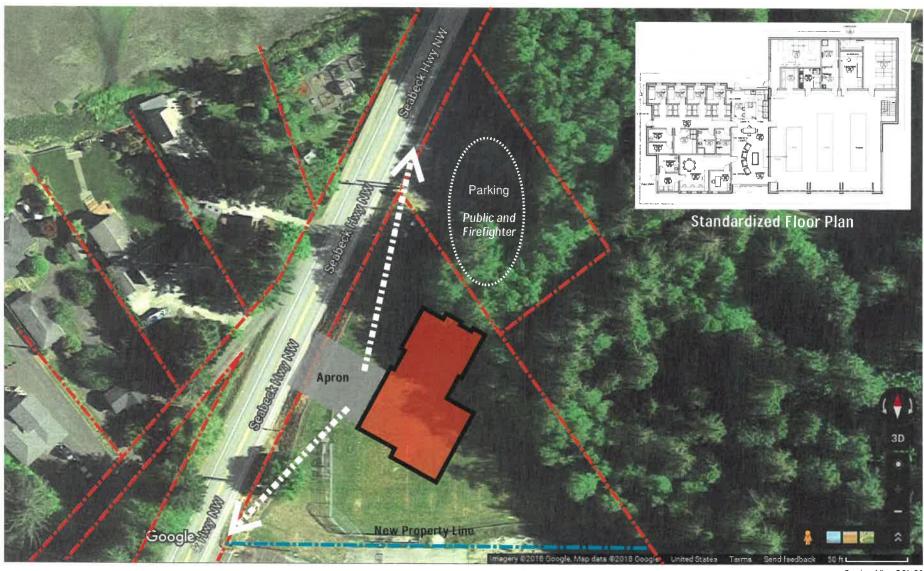
Program Requirements

Prototype Fire Station Program Requ	iii emems	Fire	Fire	Fire	Fire	Fire
		Station	Station	Station	Station	Station
		42	45	52	53	57
	3	Island	North	Anderson		
		Lake	Perry	Hill	Seabeck	Coho Run
perations			,			
Apparatus Bay (3-bays, back-in)	54' x 50'	2,700	2,700	2,700	2,700	2,700
Decon	10'x 11'	110	110	110	110	110
Shop	8' x 10'	80	80	80	80	80
Clean Project Room	16' x 12'6"	200	200	200	200	200
App Bay Restroom	8' x 12'	96	96	96	96	96
Bunker Gear Storage	15' x 21'	315	315	315	315	315
General Storage	8' x 10'	80	80	80	80	80
App Bay Janitorial	8' x 8"	64	64	64	64	64
Sprinkler Riser / Compressor	6' x 10'	60	60	60	60	60
ving Quarters	T (A) OLIVABILI	E 40	540	E40	F40	F40
(4) Sleep Rooms	(4) 9' x 15'	540	540	540	540	540
(2) Restroom/Showers	(2) 8' x 12'	192	192	192	192	192
Kitchen	14' x 20'	280	280	280	280	280
Dining for 6	16' x 14'	224	224	224	224	224
Dayroom for 4	16' x 19"	304	304 480	304 480	304	304
Fitness	24' x 20'	480			480	480
Laundry	10' x 12'	120 64	120 64	120 64	120 64	120
Janitorial	8' x 8'	04	04	04	04	64
ublic and Front of the House					,	
Public Lobby	8' x 12'	96	96	96	96	96
(1) Public Unisex Restroom	8' x 8'	64	64	64	64	64
Firefighter Work Area	18' x 20'	360	360	360	360	360
Station Officer Office	10' x 10'	100	100	100	100	100
Subtotal	720	6,529	6,529	6,529	6,529	6,529
Mechanical / Electrical	10%	653	653	653	653	653
Circulation	15%	979	979	979	979	979
Total Anticipated Square Fo	otage	8,161	8,161	8,161	8,161	8,161

End of Program Requirements



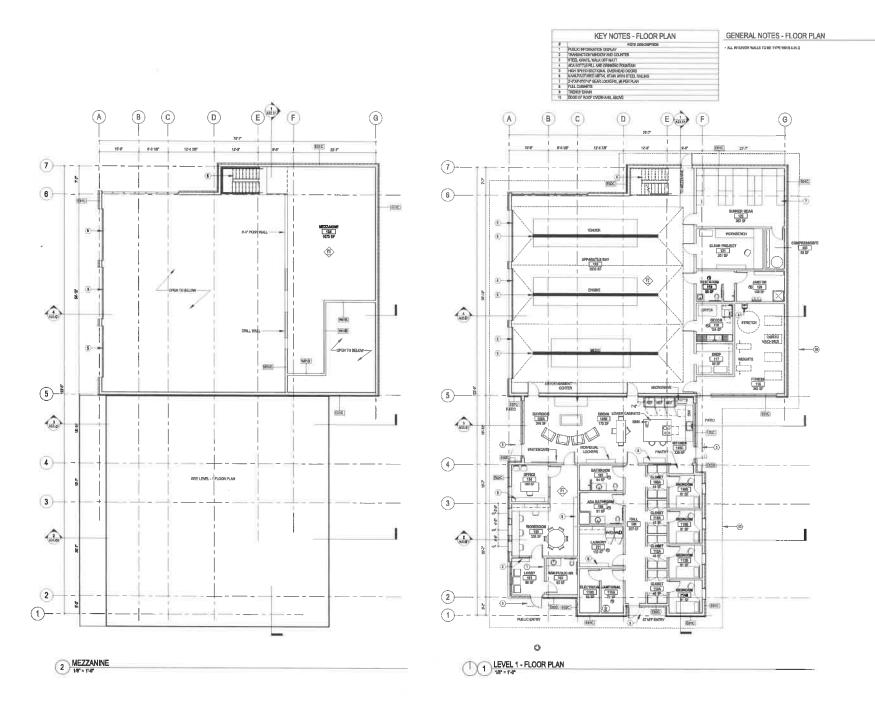








Scale: 1" = 50'-0"



RICEFERGUSMELLER

ARCHITECTURE INTERESTS PLANNING V 275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 360-377-6773 RFMARCH.COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE NEW STATION: MODEL



FLOOR PLAN

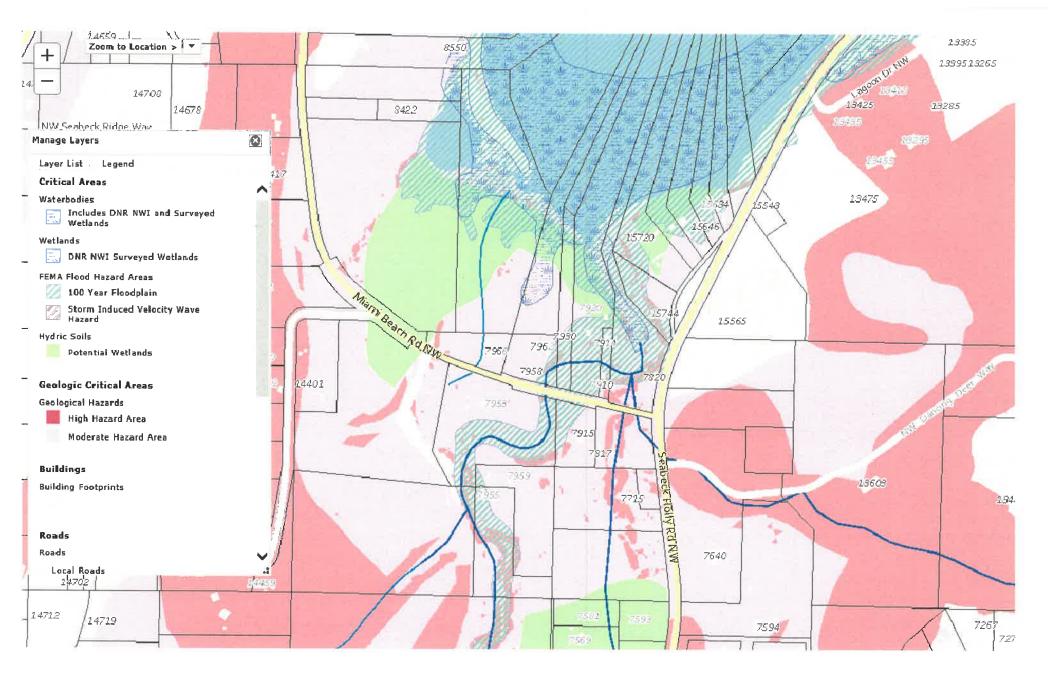
SHEET# A21.11



STATION 57 (Prototype; Stations 45, 52, and 53 similar)



STATION 57 (Prototype; Stations 45, 52, and 53 similar)



CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for:

Rice Fergus Miller Architecture



Prepared by:

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Katherine R. Brawner, P.E. Project Engineer

Reid Middleton

728 134th Street SW, Suite 200 Everett, WA 98204 425-741-3800 File No. 262019.052

1.0 Executive Summary

Seismic screenings and structural evaluations were performed for eight Central Kitsap Fire and Rescue fire facility buildings to investigate seismic deficiencies. All buildings evaluated in this study are low-rise structures and include seven fire stations and one support facility. Each building is considered critical to the City's ability to provide post-earthquake emergency services.

The evaluations determined each building's expected structural performance for an Immediate Occupancy performance objective. After a seismic event, buildings that meet an Immediate Occupancy performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. This report includes a description of each building, the identified seismic deficiencies, seismic-upgrade concept designs for four of the active stations, and recommendations. All the buildings were found to have seismic deficiencies and do not meet the Immediate Occupancy performance objective.

Concept-level seismic upgrade designs were completed for four of the stations and concept plans are provided describing options for mitigation of seismic deficiencies. Recommendations consist of strengthening and supplementing the existing lateral systems, improving lateral load paths, and improving connections. Additional factors such as operational use, functionality, response times, and historic value should also be considered in the decision-making process for these buildings.

3.6 Fire Station 53

3.6.1 Building Description

Year Built:

1963

Number of Stories:

Floor Area:

2,110 SF

Address:

15543 Seabeck

Hwy NW, Seabeck, WA



Fire Station 53, known as the Seabeck Community Fire Station, is one-story masonry structure, built on relatively flat ground. The 1963 building is rectangular in plan, measuring approximately 53 feet by 40 feet, with a maximum roof height at the apparatus bay peak of approximately 22 feet. Building construction consists of masonry walls supporting wood roof trusses. A wood-constructed hose tower is located near the center of the building. Fire Station 53 houses one engine, one tender, and one aid vehicle.



Figure 3.6-1. Fire Station 53, South Exterior.



Figure 3.6-2. Fire Station 53, East Exterior.

Structural System

Table 3.6-1. Structural System Description of Fire Station 53.

Structural System	Description
Roof	Plywood sheathing is supported by wood trusses supported by masonry exterior walls and interior beams and columns.
Floor	Drawings are not available. The floor is anticipated to be composed of a reinforced slab on grade.
Foundations	Drawings are not available. The masonry walls are anticipated to be supported by continuous concrete spread footings.
Hose Tower	The hose tower is composed of wood-framed walls on partial-height masonry walls. The walls support a roof composed of sawn lumber and plywood.
Lateral System	Reinforced masonry perimeter shear walls resist the forces in the longitudinal and transverse directions.

3.6.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.6-2. Identified Seismic Deficiencies for Fire Station 53.

Deficiency	Description			
Redundancy	Shear walls are not present at the front of the apparatus bay. Without multiple lines of resistance, increased lateral load can be applied to seismic elements beyond which they were originally designed for.			
Reinforcing Steel	Record drawings are not available, but walls are not anticipated to meet minimum reinforcing requirements. Selective demolition is required to verify this condition. Inadequate reinforcing steel in walls results in decreased capacity to resist seismic forces.			
Wall Anchorage	Record drawings are not available, but it is anticipated that wall anchorage does not have adequate strength to resist seismic forces. Separation at the wall can cause partial or total collapse of a structure and also presents a falling hazard.			

Wood Ledgers

Record drawings are not available, but it is anticipated that cross-grain bending is created in the connections between walls and diaphragm. Wood ledgers are weak in tension perpendicular to grain and can cause separation of the diaphragm and walls that may result in partial or complete collapse of the structure.

Transfer to Shear Walls

Connections between diaphragm and shear walls are anticipated to lack the strength required to develop the full shear strength of the walls or diaphragm. This connection must have adequate strength to complete the lateral load path to the foundation.

Foundation Dowels

Doweled wall reinforcement is anticipated to lack the strength required to resist seismic forces between the structure and foundation. Inadequate foundation connections create gaps in load path that limit the structure's ability to resist seismic forces.

Diagonally Sheathed and Unblocked Diaphragms The span of the unblocked diaphragm exceeds 30 feet. Unblocked diaphragms are prone to premature failure due to joist rolling, especially when spans exceed the recommended length.

Stiffness of Wall Anchors Record drawings are not available, but the relative movement between walls and diaphragm is expected to exceed 1/8 inch. Such movement before wall anchors engage can cause loss of vertical bearing support of the wall and crossgrain bending in ledgers.

There are several instances where the compliance of an aspect of the building could not be conclude with certainty given the available resources. Assumptions can be made about some of these to suggest compliance or noncompliance. There was no geotechnical report provided for the site in question, causing checklists items involving soil to be marked as "unknown." It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be done for verification.

3.6.3 Findings and Recommendations

Fire Station 53 does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. Deficiencies include inadequate wall connections at the roof and foundation, inadequate roof diaphragm capacity, and insufficient shear walls and shear wall strength, particularly at the apparatus bay doors, where an adequate lateral load path is not present. The masonry hose tower also poses a serious falling hazard that could cause more damage to the building and occupants. Due to the extent of the deficiencies, and because of the type of construction, extensive damage and potential for failure of the LFRS during a design-level earthquake is possible. A structural upgrade concept design was not completed for Fire Station 53. It is recommended that the building be replaced to meet the IO performance objective. Upgrading the existing building is also an option; however, with the combination of deficiencies

and the expectancy that the existing building does not address current programming and planning needs, a replacement may better suit the fire district's residents and the fire district.

17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		Х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
		Х		MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System – Building Configuration

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
		х		SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
X				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
		х		MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			X	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
			Х	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			х	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
Х				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	Record drawings are not available but check is anticipated to be not applicable as foundations are anticipated to be grade beams.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Very Low Seismicity

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	x			REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	Shear walls not present at the front of the apparatus bay
X				SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in. ₂ (4.83 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	
	x			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. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)	Record drawings are not available but check is anticipated to be not compliant.

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	X			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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)	Record drawings are not available but check is anticipated to be not compliant due to lack of connection strength.
	х			WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)	Record drawings are not available but check is anticipated to be not compliant.
	X			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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)	Record drawings are not available but check is anticipated to be not compliant due to lack of connection strength.
	Х			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. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	Record drawings are not available but check is anticipated to be not compliant due to lack of dowel strength.
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	No girder/column conditions observed. Record drawings are not available but check is anticipated to be compliant

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Stiff Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		X		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	
		х		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.3)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	Record drawings are not available but check is anticipated to be not applicable and strip footings present.
		Х		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Tier 2: Sec. 5.5.3.1.5; Commentary: Sec. A.3.2.4.3)	Record drawings are not available but check is anticipated to be compliant.
X				PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30. (Tier 2: Sec. 5.5.3.1.2; Commentary: Sec. A.3.2.4.4)	

Diaphragms (Stiff or Flexible)

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	
		х		OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	
		·X		PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)	

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х			No diaphragm openings larger than 50% of building width.

Flexible Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)	Wood trusses observed for roof framing.
		Х		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	
х				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	Wood structural panels observed.
	х			DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	Unblocked diaphragm with spans exceeding 30 feet
		х		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 (12.2 m) and have aspect ratios less than 4-to-1. (Tier 2: Sec. 5.6.3; Commentary: Sec. A.4.3.1)	
X				OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	Х			masonry walls to wood structural elements are installed taut and	Record drawings are not available but check is anticipated to be not compliant.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

Fire Station 56 - Seabeck / Nicholas

Fire Station 56 was constructed in 1998. The station is 13,526 square feet and includes living quarters for 11 personnel, three deep drive-through apparatus bays, community meetings rooms, office and work areas, and support spaces for caring, washing, and storing equipment and supplies. Although this station is 21 years old, the operational layout includes most of the features and attributes expected in a modern fire station. Some aspects of the mechanical and electrical systems have been upgraded over the years.



Fire Station 56 – Seabeck / Nicholas 6470 Seabeck Hwy NW, Bremerton, WA 98312

The large apparatus bay accommodates a fire engine, tender, medic, brush truck, an aid, and a John Deere Utility Terrain Vehicle.

Site development elements surrounding the station include public parking, a refueling area for fire apparatus, vehicle wash area, drill area, and firefighter parking.

Observed Deficiencies

- Inadequate bunker gear storage
- Inadequate Shop area
- Less than adequate decontamination facilities
- Fitness Room out of scale with station's personnel capacity (11)
- Firefighter work area out of scale with station's personnel capacity (11)
- Station is at risk of being unsafe to occupy after a design-level earthquake
- Inadequate storage for equipment and supplies throughout station
- Group restroom/showers in place of today's standard for private facilities
- Low level of building security exterior doors, visibility of entrances, parking areas

Proposed Improvements

Phase 1: Immediate Needs

Of the deficiencies noted above, Station 56's seismic inadequacies are of the greatest immediate concern. In the event of a major earthquake, the operational readiness of this station could be substantially compromised and threaten the health and safety of the building occupants. It is recommended that, at a minimum, Station 56 undergo a seismic retrofit to bring it into compliance with current codes and standards.



Construction costs for the seismic improvements to Station 56 have been estimated at approximately \$364,791.00.

Phase 2: Deferred Improvements

The mid-range vision for Fire Station 56 would include minor interior remodeling in a few key areas. These improvements would target the deficiencies noted above that would do the most to improve the station's daily operations. An underutilized training room would be converted to bunker gear storage and a modern decontamination area. Two of the 11 sleep rooms would be repurposed into a larger fitness room. Improvements would be made for firefighter workspace allowing the current work room to be converted to a Station Captain's Office. In addition, the general support spaces on the south side of the apparatus bay would be reorganized and reconfigured for better use of space.

Construction costs for these deferred improvements have been estimated at approximately \$337,006.00. If undertaken in conjunction with the seismic improvements, the combined construction cost would be approximately \$701,797.00.

Phase 3: Long-Range Improvements

Along with the seismic upgrades and interior improvements noted above, the long-range vision would involve adding a four-bay storage building behind the station. The purpose of this building would be to house reserve apparatus and other fire district vehicles that are now being stored outside in a non-secured environment. The structure would meet current energy code requirements but heated only to a level of freeze protection. Size of the building would be approximately 50' deep by 80' wide with four roll-up overhead doors. A large paved area would surround this new Storage Building which could serve as an auxiliary area for driving training, laying hose, and a variety of hands-on training exercises. The longer long-range vision could include additional firefighter training props and features in this area.

The estimated construction cost for these long-range improvements is approximately \$1,902,936.00 in 2019 dollars. This amount does not include project expenses or inflation, which would be dependent on the construction start date.

End of Fire Station 56 - Seabeck / Nicholas



KEY NOTES - FLOOR PLAN GENERAL NOTES - FLOOR PLAN

ARCHITECTURE PLUMING VIELAS 275 FIFTH STREET, SUITE 100 BREWERTON, WA 98337 380-377-377 RFMARCH.COM



CENTRAL KITSAP FIRE & RESCUE STATION 56 PROJECT ADDRESS CITY NAME, STATE



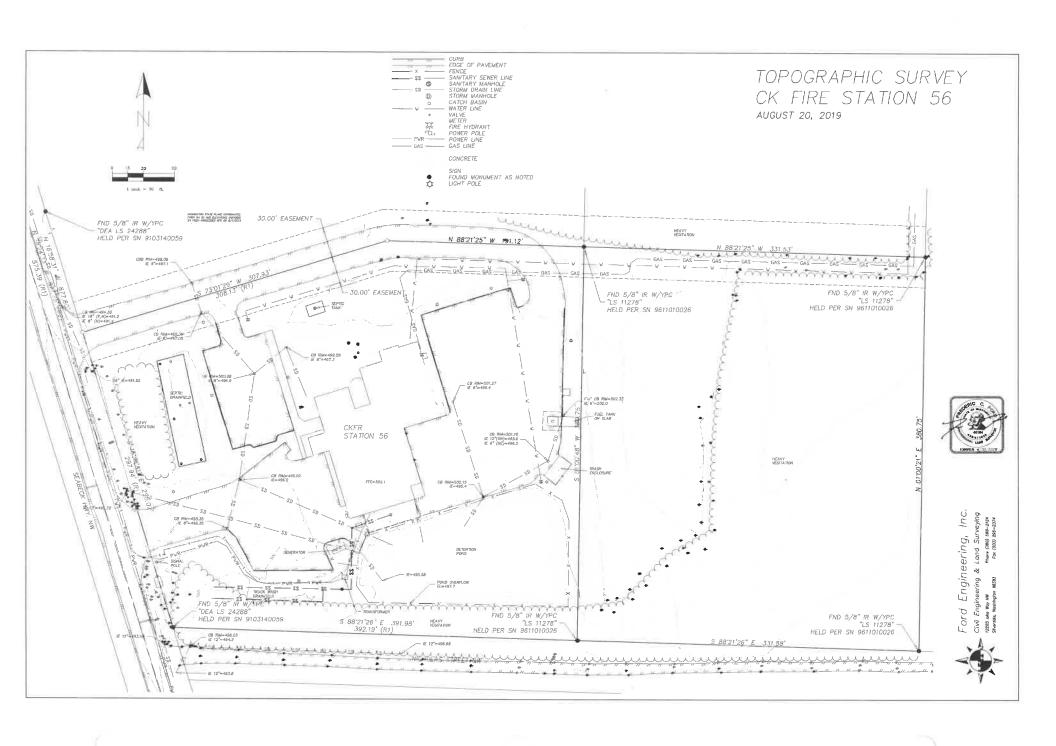
FLOOR PLAN - LEVEL 1

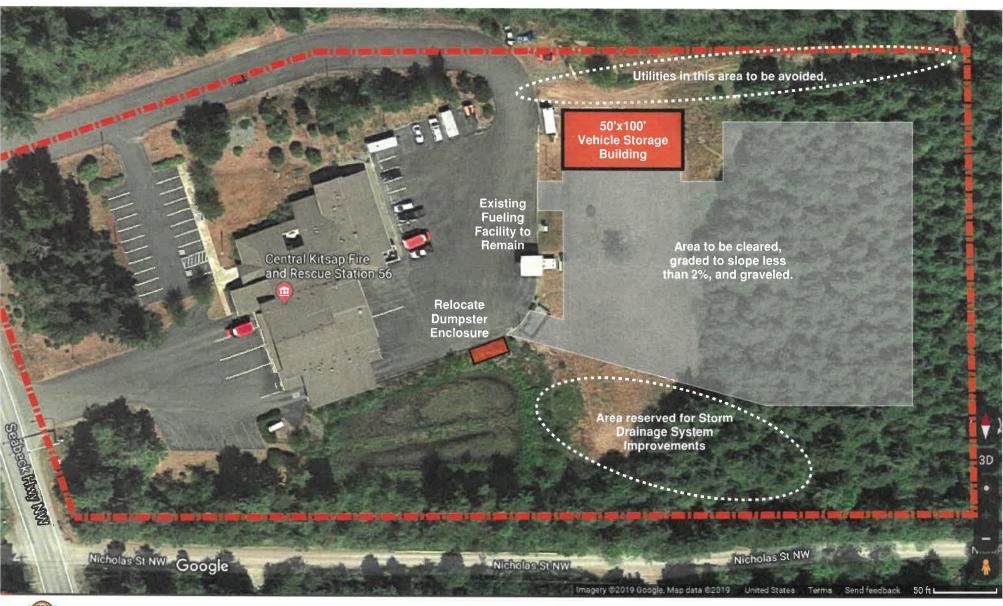
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WEIGHT RM EAVROOM 113 DOPLM 69 120 CABINETRY -127 COURTYARD 4° CONCRETE SLAB OFFRCE 180 CONF. RM. & ECC 182 UTILITY 127 REF REF REF DORN de 13d DORM #8 SHOWER 139 183 TABLE STOR DORN \$4 134 TRABING & ENERGENCY COMMAND CENTER 112 141 WALL INCUNTED ----SOUND SYSTEM AMP. WALL MOUNTED — TELEVISION SHELF GROSS AREA: 12,386 SF APPARATES BAY DUAL DRINKING SCBA REPAIR () LIE COXY CYLBODES 18M 197 EXHAUST LOUVER -80 4 4 6 1

1 LEVEL 1 - FLOOR PLAN



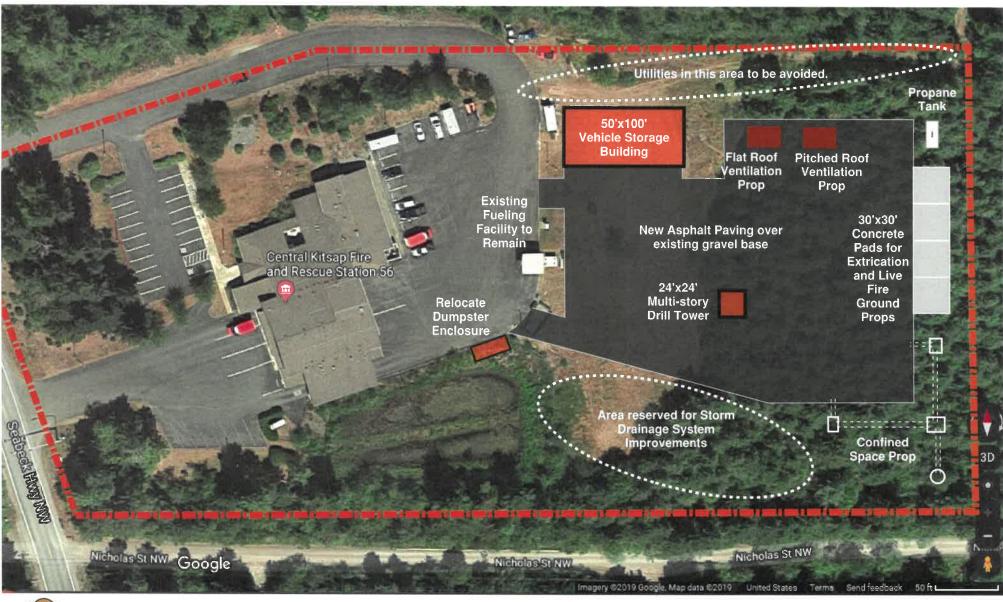








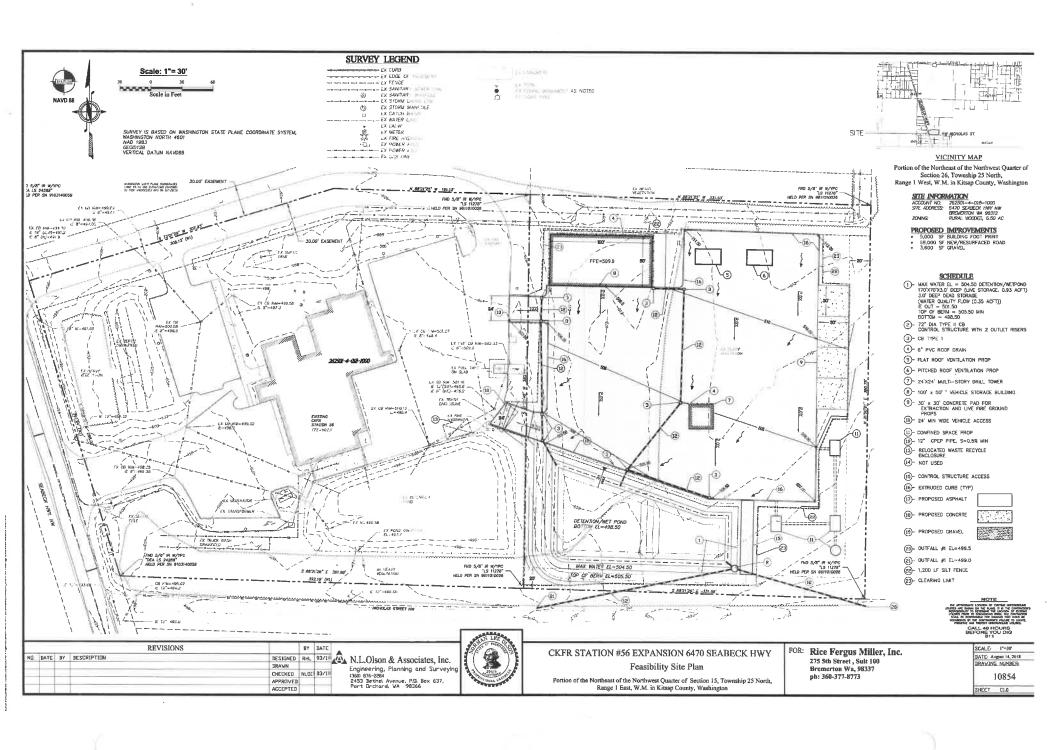






Site Diagram
1" =50'-0"
(when printed 11x17)







Central Kitsap Fire and Rescue Bond Study 10/2/2019

Station 56-Seabeck Highway

Minor Remodel \$ 337,006
Seismic Work \$ 364,791
Site Work Station 56 \$ 1,902,936
Total direct Today's Dollars \$ 2,604,733

Escalation
State Sales Tax
Construction Contingency
Architect/Engineering Fees
Permits
Toxic Soils/Materials Removal
Construction Management Fees
Utility Infrastructure to Site
Piling/Special Foundations
Wetland Mitigation
Jurisdictional/Utility Co. Fees

Owner's Consultant Costs

Exclusions:

Equipment & Furnishings Not Listed
Off Site Work
Builders Risk Insurance
Moving/Relocation Expense
Alternative Delivery-GC/CM, Design-Build
Legal Expense
Land Purchase/Financing Costs
Fire Vehicles/Apparatus/Radio Towers
Project/Bid Market/Code Change Contingency



Station 56 Minor Remodel Estimate Summary

Station 56 Gross Area: 13,792 Sr-Rates Current At September 2019

Desc	ription		ost/SF	Total Cost
A10	Foundations		\$0.20	\$2,800
C10	Interior Construction		\$2.21	\$30,450
C30	Interior Finishes		\$3.74	\$51,596
D20	Plumbing		\$2.03	\$28,000
D30	HVAC		\$1.81	\$25,000
D50	Electrical		\$1.81	\$25,000
E10	Equipment		\$3.06	\$42,235
E20	Furnishings			Excl.
F20	Selective Building Demolition		\$1.07	\$14,824
Z 10	General Conditions		\$4.35	\$60,000
		ESTIMATED NET COST	\$20.29	\$279,905
MAR	GINS & ADJUSTMENTS			
Desig	n Contingency-Remodel	12.0 %		\$33,589
Contr	actors Overhead & Profit	7.5 %		\$23,512
		ESTIMATED TOTAL COST	\$24.43	\$337,006



Station 56 Minor Remodel Estimate Detail

Station 56 Gross Area: 13,792 SF Rates Current At September 2019

Descrip	ption		Unit	Qty	Rate	Total Cos
A1030	Slab on Grade					
339	Slab cut and patch for plumbing		SF	140	20.00	2,800
		Slab on Grade			\$0.20/SF	\$2,800
C1010	Partitions					
341	Interior partitions		LF	55	275.00	15,12
342	Partition-infills		LF	10	305.00	3,05
343	Frame walk-thru openings		EA	2	750.00	1,500
344	Frame door openings in existing wall		EA	3	425.00	1,27
		Partitions [*]			\$1.52/SF	\$20,95
C1020	Interior Doors					
345	Int. HM door/frame/hdwre-per leaf		EA	4	2,000.00	8,000
		Interior Doors			\$0.58/SF	\$8,000
C1030	Specialties					
346	Specialties allowance		LS	1	1,500.00	1,500
		Specialties •			\$0.11/SF	\$1,500
C3010	Wall Finishes					
347	Epoxy wall coating at decon and wash alcove-allow	8'	SF	328	16.00	5,248
348	Plam wall janitor rooms		SF	180	9.00	1,620
349	Interior Painting/patching/sealing		LS	1	15,000.00	15,000
		Wall Finishes			\$1.59/SF	\$21,86
C3020	Floor Finishes					
350	Epoxy flooring-decon		SF	132	16.00	2,112
351	Athletic flooring-fitness room		SF	468	12.00	5,616
352	Misc. flooring protect/replace at balance of remodel		LS	1	12,000.00	12,000
		Floor Finishes			\$1.43/SF	\$19,72
C3030	Ceiling Finishes					
353	Celings allowance		LS	1	10,000.00	10,000
		Ceiling Finishes			\$0.73/SF	\$10,000
D2010	Plumbing Fixtures					
354	Plumbing allowance		LS	1	28,000.00	28,000
.		lumbing Fixtures			\$2.03/SF	\$28,000



Station 56 Minor Remodel Estimate Detail

Station 56 Gross Area: 13,792 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
D3090	Other HVAC Systems and Equipment				
355	HVAC allowance	LS	1	25,000.00	25,000
	Other HVAC Systems and Equipment			\$1.81/SF	\$25,000
D5090	Other Electrical Services				
356	Electrical allowance	LS	1	25,000.00	25,000
	Other Electrical Services			\$1.81/SF	\$25,000
E1090	Other Equipment				
357	Extractor/dryer	LS	1	28,500.00	28,500
358	Bunker gear lockers	EA	23	545.00	12,535
359	Misc. equipment/FOIC	LS	1	1,200.00	1,200
	Other Equipment			\$3.06/SF	\$42,235
E2010	Fixed Furnishings				
360	Casework/casework modifications-none	LS	1		Excl.
	Fixed Furnishings				Exc
F2010	Building Elements Demolition				
333	Demo interior walls	LF.	65	32.00	2,080
334	Demo interior doors/frames/hardware	EA	6	100.00	600
335	Cut in/demo for walk-thru	EA	2	250.00	500
336	Demo bunker gear racks	LF	41	25.00	1,025
337	Misc. interior demo @new decon,app sto, bunker gear,fitness	SF	1,404	5.50	7,722
338	Mis. interior demo @ SCBA, air fill, shop, project area	SF	742	3.50	2,597
340	Cut in/demo for new single door	EA	2	150.00	300
	Building Elements Demolition			\$1.07/SF	\$14,824
Z1010	General Conditions				
361	General conditions	Mth	3	20,000.00	60,000
	General Conditions			\$4.35/SF	\$60,000
	ESTIMATED NET COST			\$20.29/SF	\$279,905



Station 56 Seismic Estimate Summary

Station 56 Seismic Gross Area: 13,792 SF Rates Current At September 2019

Description		Cost/SF	Total Cost
A10 Foundations		\$1.09	\$15,025
B10 Superstructure		\$13.03	\$179,685
C30 Interior Finishes		\$3.50	\$48,272
Z10 General Conditions		\$4.35	\$60,000
	ESTIMATED NET COST	\$21.97	\$302,982
MARGINS & ADJUSTMENTS			
Design Contingency-Remodel	12.0 %		\$36,358
Contractors Overhead & Profit	7.5 %		\$25,451
	ESTIMATED TOTAL COST	\$26.45	\$364,791



Station 56 Seismice Estimate Detail

Station 56 Seismic Gross Area: 13,792 Shates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
A1010	Standard Foundations				
362	Cut slab, new foundation @ shotcrete wall, patch slab	LF	26	300.00	7,800
364	Holddowns added	EA	17	425.00	7,225
	Standard Foundations			\$1.09/SF	\$15,025
B1020	Roof Construction				
363	Shotcrete walls-allow avg hgt. 22' w/connections	SF	572	75.00	42,900
365	Shear wall at foundation, 2nd, and level w/connections	[™] LF	399	240.00	95,760
366	Upgrade diaphragm to wall connections	LF	46	175.00	8,050
367	Upgrade diaphragm at roof step	LF	69	175.00	12,075
368	Drag strut and connect to wall	LF	95	220.00	20,900
	Roof Construction			\$13.03/SF	\$179,685
C3010	Wall Finishes				
369	Remove/replace/protect-finishes, MEP @ seismic retrofit	SF	13,792	3.50	48,272
	Wall Finishes			\$3.50/SF	\$48,272
Z1010	General Conditions				
361	General conditions	Mth	3	20,000.00	60,000
	General Conditions			\$4.35/SF	\$60,000
	ESTIMATED NET COST			\$21.97/SF	\$302,982



Station 56 Site Work Summary

Site area construction limits: 91,476 SF Rates Current At September 2019

Desc	ription	Co	ost/SF	Total Cost
A10	Foundations		\$1.23	\$112,500
B20	Exterior Enclosure		\$0.82	\$75,000
D30	HVAC		\$0.82	\$75,000
D40	Fire Protection		\$0.37	\$34,000
D50	Electrical		\$0.55	\$50,000
F10	Special Construction		\$3.55	\$325,000
G10	Site Preparations		\$2.81	\$257,136
G20	Site Improvements		\$4.63	\$423,500
G30	Site Civil/Mechanical Utilities		\$0.62	\$57,008
Z 10	General Conditions		\$0.72	\$66,000
	Α.	ESTIMATED NET COST :	\$16.13	\$1,475,144
MAR	GINS & ADJUSTMENTS	8		
Desig	gn Contingency-Site	20.0 %		\$295,029
Contr	ractors Overhead & Profit	7.5 %		\$132,763
		ESTIMATED TOTAL COST	\$20.80	\$1,902,936



Station 56 Site Work Detail

Site area construction limits: 91,476 Sh Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cos
A1010	Standard Foundations				
370	Foundation allowance-storage building	SF	5,000	14.00	70,00
	Standard Foundations	s		\$0.77/SF	\$70,00
A1030	Slab on Grade				
371	Slab for storage building	SF	5,000	8.50	42,50
	Slab on Grade	е		\$0.46/SF	\$42,50
B2030	Exterior Doors				
372	Exterior doors/frames/hardware-per leaf	EA	2	3,000.00	6,00
373	Standard 14' x 14' overhead doors	EA	6	11,500.00	69,000
	Exterior Doors	S		\$0.82/SF	\$75,00
D3090	Other HVAC Systems and Equipment				
374	HVAC allowacne	SF	5,000	15.00	75,000
	Other HVAC Systems and Equipmen	t		\$0.82/SF	\$75,00
D4040	Sprinklers				
79	Fire protection-allowance	SF	5,000	6.80	34,00
	Sprinklers	5		\$0.37/SF	\$34,00
)5090	Other Electrical Services				
375	Minor electrical /lighting for storage building	SF	5,000	10.00	50,000
	Other Electrical Services	3		\$0.55/SF	\$50,000
F1010	Special Structures				
376	Pre-engineered building-storage	SF	5,000	65.00	325,000
	Special Structures	5		\$3.55/SF	\$325,000
G1010	Site Clearing				
100	Site clearing, hard surface demolition, misc. demoltion	SF	91,476	0.50	45,738
	Site Clearing	1		\$0.50/SF	\$45,738
G1030	Site Earthwork				
108	Temporary Erosion Control	SF	91,476	0.50	45,738
390	Earthwork	LS	1	165,660.00	165,660
	Site Earthwork	S		\$2.31/SF	\$211,398
32020	Parking Lots				
388	Asphalt, concrete surfacings	LS	1	394,460.00	394,460
	Parking Lots	3		\$4.31/SF	\$394,460



Station 56 Site Work Detail

Site area construction limits: 91,476 SF Rates Current At September 2019

Descri	otion		Unit	Qty	Rate	Total Cost
G2040	Site Development					
392	Misctraffic control, fencing,trench		LS	1	12,540.00	12,540
		Site Development	<u></u>		\$0.14/SF	\$12,540
G2050	Landcaping					
391	Landscape/irrigation		LS	1	16,500.00	16,500
		Landcaping			\$0.18/SF	\$16,500
G3030	Storm Sewer					
389	Storm drainage systems		LS	1	57,008.00	57,008
		Storm Sewer			\$0.62/SF	\$57,008
Z1010	General Conditions					
393	General conditions/mob		LS	1	66,000.00	66,000
		General Conditions			\$0.72/SF	\$66,000
		ESTIMATED NET COST			\$16.13/SF	\$1,475,144

CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for:

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1.0 Executive Summary

Seismic screenings and structural evaluations were performed for eight Central Kitsap Fire and Rescue fire facility buildings to investigate seismic deficiencies. All buildings evaluated in this study are low-rise structures and include seven fire stations and one support facility. Each building is considered critical to the City's ability to provide post-earthquake emergency services.

The evaluations determined each building's expected structural performance for an Immediate Occupancy performance objective. After a seismic event, buildings that meet an Immediate Occupancy performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. This report includes a description of each building, the identified seismic deficiencies, seismic-upgrade concept designs for four of the active stations, and recommendations. All the buildings were found to have seismic deficiencies and do not meet the Immediate Occupancy performance objective.

Concept-level seismic upgrade designs were completed for four of the stations and concept plans are provided describing options for mitigation of seismic deficiencies. Recommendations consist of strengthening and supplementing the existing lateral systems, improving lateral load paths, and improving connections. Additional factors such as operational use, functionality, response times, and historic value should also be considered in the decision-making process for these buildings.

3.7 Fire Station 56

3.7.1 Building Description

Year Built:

1998

Number of Stories:

Floor Area:

15,200 SF

Address:

6470 Seabeck

Hwy NW,

Bremerton, WA



Fire Station 56, known as the Seabeck/Nicholas Community Fire station, is a partial two-story mixed masonry and wood structure. In its widest dimensions, the 1998 building is 168 feet by 128 feet. The partial second floors are located to the northwest and to the south of the apparatus bay. The roof has multiple slopes in multiple directions; however the primary slope begins at the center of the apparatus bay and slopes down on both sides. Fire Station 56 has 24-hour vehicle fueling available and houses one engine, one tender, one medic vehicle, one aid vehicle, one brush truck, and one Utility Terrain Vehicle.



Figure 3.7-1. Fire Station 56, East Exterior.



Figure 3.7-2. Fire Station 56, North Exterior.

Structural System

Table 3.7-1. Structural System Description of Fire Station 56.

Structural System	Description
Roof	The roof system is primarily composed of wood I-joists with plywood sheathing framing to wood beams and walls. At the apparatus bay roof framing consists of open web trusses with plywood sheathing.
Floor	The floor consists of reinforced concrete slab on grade varying in thickness from 4 to 6 inches. The second floor is composed of wood I-joists framing with plywood sheathing.
Foundations	The masonry and wood walls are supported by continuous concrete spread footings. Columns are supported by concrete spread footings.
Hose Tower	N/A.
Lateral System	Reinforced masonry shear walls provide lateral resistance for the apparatus bay and for the two-story portion of the building to the south of the apparatus bay. Wood-framed shear walls provide lateral resistance for the building portion to the north of the apparatus bay in both the longitudinal and transverse directions.

3.7.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.7-2. Identified Seismic Deficiencies for Fire Station 56.

Deficiency	Description
Shear Stress Check (Wood and Masonry)	The shear in the wood shear walls in the north/south direction exceeds the allowable 1,000 pounds per linear foot. The masonry shear walls in the north/south direction on the south side of the apparatus bay are overstressed.
Narrow Wood Shear Walls	Walls in the building portion north of the apparatus bay exceeding 1.5-to-1 are being utilized to resist seismic forces. Walls with large aspect ratios are likely to be highly stressed and subject to severe deformations that reduce capacity.

Diaphragm Continuity	The diaphragm has split levels, creating a discontinuity that may cause separate diaphragms to act as if cantilevered, increasing lateral deflections.
Roof Chord Continuity	Diaphragm chord elements are not continuous through the diaphragm separation. Diaphragms with discontinuous chords are prone to higher deflections, causing damage along the perimeter of the structure.
Transfer to Shear Walls	Collector-to-wall connections used for lateral resistance from the apparatus bay to the shear walls south of the apparatus bay do not have adequate capacity.
Wood Ledgers	Wood ledgers are used in the connection between the floor and walls of the structure. Wood ledgers are weak in tension perpendicular to grain and can cause a separation of the diaphragm and walls that may result in partial or complete collapse of the structure.

There was no geotechnical report provided for the site in question, causing checklist items involving soil to be marked as "unknown." It is expected that the soils on site are compliant with liquefaction, slope failure, and surface fault rupture expectations, but further investigation may need to be completed for verification.

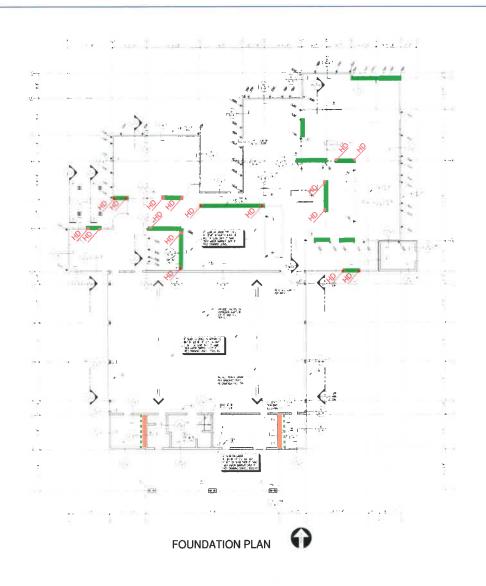
3.7.3 Findings and Recommendations

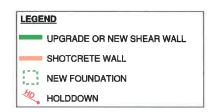
Fire Station 56 does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. Some of the wood shear walls are overstressed, and some of the connections are deficient, creating the potential for damage of the LFRS during a design-level earthquake. Based on the identified deficiencies and the age of the structure, a more-detailed seismic evaluation of the structure may show that the building complies with the performance objective. It is recommended that the building undergo a more-detailed evaluation and be retrofitted based on the findings of that evaluation.

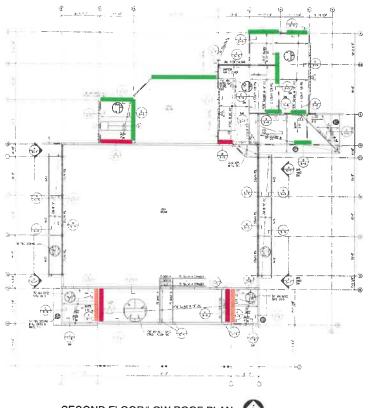
Irrespective of a more-detailed evaluation, Figures 3.7-3 through 3.7-5 display the schematic-level upgrade concepts to improve the LFRS and meet the IO performance objective. The upgrade concept involves adding shear capacity to the lateral system in both the longitudinal and transverse directions throughout the building, upgrading drag struts and their connections, adding diaphragm chords, and improving roof-to-wall connections.

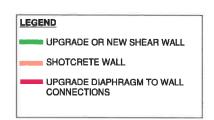
Strengthening existing shear walls includes upgrading discreet masonry and wood shear walls. The masonry walls in the north/south direction on the south side of the apparatus bay will be strengthened. To increase shear capacity of the wood lateral system, specified interior and exterior walls will be strengthened with additional sheathing and nailing. The shear-wall-to-roof connections should be upgraded to provide a complete load path for the building to resist seismic loads where the walls are upgraded and at the few locations where the wall-to-floor connections induce cross grain bending.

Drag struts and chords are also being added to adequately transfer seismic loads at steps in the roof diaphragm and to wood shear walls. Existing drag struts and connections should also be upgraded to adequately transfer forces to the lateral system.



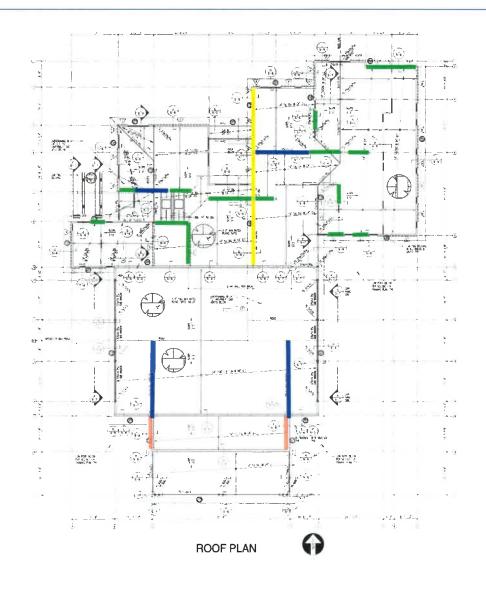






SECOND FLOOR/LOW ROOF PLAN







17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
Х				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	e :
X				MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

$Building\ System-Building\ Configuration$

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	Partial second stories.
X				SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	Partial second stories.
X				VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	
X				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
X				MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
X				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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
			Х	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)	
			Х	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			X	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
·X				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		Х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-7. Immediate Occupancy Checklist for Building Type W2

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
	х			SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing, 1,000 lb/ft (14.6 kN/m); Diagonal sheathing, 700 lb/ft (10.2 kN/m); Straight sheathing, 100 lb/ft (1.5 kN/m); All other conditions, 100 lb/ft (1.5 kN/m). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec.A.3.2.7.1)	Demand: 1200 lb/ft Allowable: 1000 lb/ft 1200 lb/ft > 1000 lb/ft
X				STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multistory buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.2)	
X				GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.3)	
X				NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	
X				WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Tier 2: Sec. 5.5.3.6.2; Commentary: Sec. A.3.2.7.5)	
		X		HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Tier 2: Sec. 5.5.3.6.3; Commentary: Sec. A.3.2.7.6)	
		X		CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Tier 2: Sec. 5.5.3.6.4; Commentary: Sec. A.3.2.7.7)	
		X		OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Tier 2: Sec. 5.5.3.6.5; Commentary: Sec. A.3.2.7.8)	Openings in walls of the apparatus bay. Walls are designed with steel framing.
X				HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices. (Tier 2: Sec. 5.5.3.6.6; Commentary: Sec. A.3.2.7.9)	

17-7. Immediate Occupancy Checklist for Building Type W2

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD POSTS: There is a positive connection of wood posts to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.3)	
X				WOOD SILLS: All wood sills are bolted to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.4)	
X	-			GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
		X		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: 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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	X			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	a

Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	х			DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.1)	Diaphragm has split levels.
	X			ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.3)	
		Х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	
		Х		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	

17-7. Immediate Occupancy Checklist for Building Type W2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
		Х		DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.1 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
X				OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less with acceptable edge and end distance provided for wood and concrete. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.7)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Very Low Seismicity

Seismic-Force-Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
x				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	Masonry shear walls only present at apparatus bay.
	x			SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in. ₂ (4.83 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	
x				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. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)	Vert: #5 @ 24" Нотіz: #5 @ 48"

Connections

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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 have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)	Capacity: 13.2 k Demand: 6.72 k 6.72 < 13.2
	Х			WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)	Floor ledger to masonry wall per Detail B/S-5.
	X			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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)	
X				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. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Stiff Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)	
		х		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. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.3)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
		Х		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (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

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

Diaphragms (Stiff or Flexible)

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		X		OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)	
		X		OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)	

17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)	
		х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	

Flexible Diaphragms

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)	
X				STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	
X				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
		х		DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
		х		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 (12.2 m) and have aspect ratios less than 4-to-1. (Tier 2: Sec. 5.6.3; Commentary: Sec. A.4.3.1)	
X				OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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. (Tier 2: Sec. 5.7.1.2; Commentary: Sec. A.5.1.4)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.



N.L. OLSON & ASSOCIATES, INC. Engineering, Planning & Land Surveying

2453 Bethel Avenue
Port Orchard, WA 98366
P. 360-876-2284 / F.360-876-1487
www.nlolson.com

TECHNICAL MEMORANDUM PROJECT STORM DRAINGE ANALYSIS

Project: Central Kitsap Fire & Rescue Station 56, Seabeck Hwy

To: Rice Fergus Miller, Attn: Lorie Limson Cook

Subject: Stormwater Management System

Date: September 23, 2019

This Technical Memorandum (TM) summarizes the storm drainage analysis and system design feasibility requested by RFM of the proposed improvements of Central Kitsap Fire Rescue Station 56 located at 6470 Seabeck Hwy. The proposed improvements are located undeveloped wooded area east of the station house, and include the addition of a 5,000 sf vehicle storage building, drill tower and other training props used by the fire department. Infrastructure improvements include approximately 60,000 sf of asphalt, concrete and gravel, access from the existing rear parking area and a detention/wetpond located south of the proposed improvements.

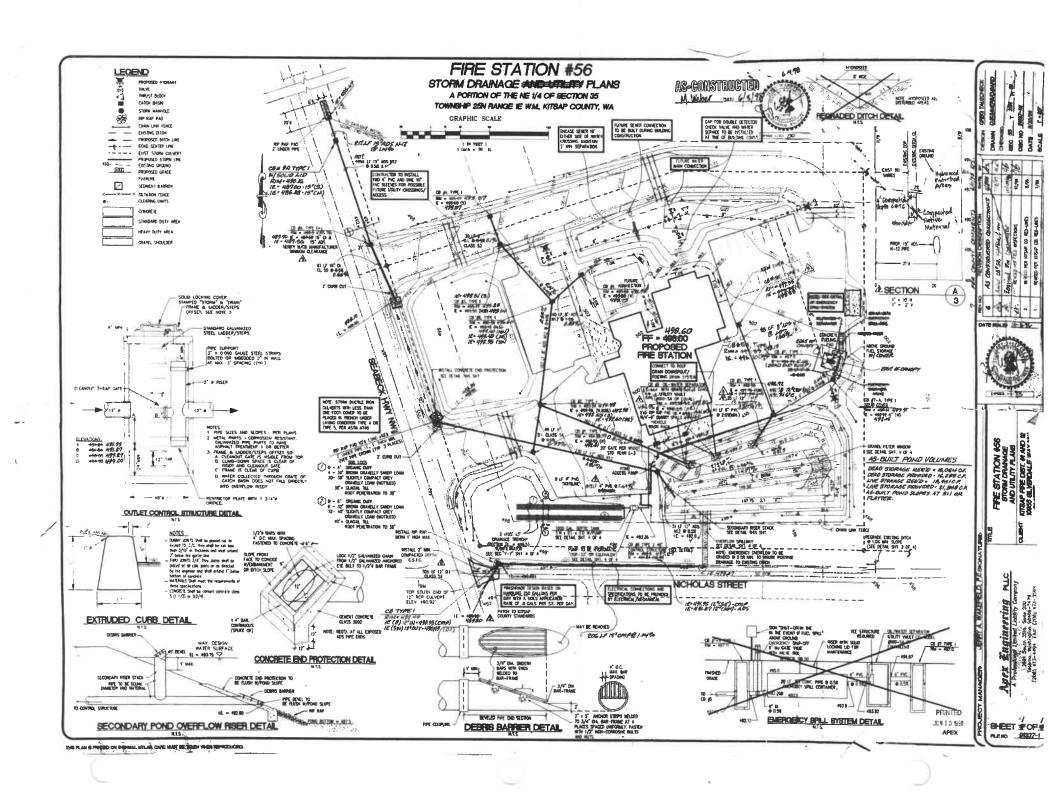
Based on the evaluation of the minimum requirements thresholds for Development and Redevelopment per Kitsap County Stormwater Manual (KCSWM) Vol 1, chapter 4 flow charts 4.1 and 4.2. Because of the size of the development Minimum requirements 1-9 apply.

The following parameters are the bases for the pond sizing, water quality mitigation and the conveyance systems. Based on the geotechnical report infiltration is not considered feasible, consequently a detention/wetpond is proposed. The WWHM 2012 continuous flow model program with a Quilcene 0.8 rain gauge is used for analysis.

- Total disturbed area is 91,500 sf (2.10 ac).
- Impervious area is 66,600 sf (1.53 ac).
- Landscaped & pond area is 24,900 sf (0.57 ac).

The pond size needed for flow control requirements, and passing duration test, measures 170' long, 70, wide and 3' deep (0.93 acft). The proposed wet pond is 3' deep (0.35 acft) and below the live storage volume of the detention pond. The site has two storm basins so discharge is to the existing drainage ditch located southeast and southwest of the site. The pond and associated grading require approximately 21,000 sf of space for placement, and an excavation of approximately 2,000 cy of material. The pond will also require an approximately 100 foot long berm on the southeast corner of the pond and will have a maximum water embankment height of 2.5' above existing grade.

NL OLSON & ASSOCIATES INC	111			roject:	+	abeck Hwy Fi	e S	tation
Prepared By:	RHL		-	lient:	RF		_	
			D	ate:	23	-Sep-19		
Brief Scope:	Project Bu	daet - Sit	e [Development	Pe	ermit		
Building Size:	~5,000	SF	T					
Site Size:	~2.10	Acres						
		Unit	1	¢/i imié	_	Cost		Total
Description	Quantity	Unit	-	\$/Unit		Cost		iotai
Construction Cost							\$	822,597.93
Mobilization								
site and off-site	1	allowance	\$	60,000.00	\$	60,000.00		
Sub-Total							\$	60,000.00
Demolition								
dispose of concret	10	tons	\$	60.00	\$	600.00		
sawcut pavement	50	If	\$	3.50	\$	175.00		
Sub-Total							\$	775.00
Earthwork								
clear/grub/strip	2	acre	\$	5,000.00	\$	10,000.00		
strip organic layer	1600		\$	8.00	\$	12,800.00		
excavation	10000		\$	8.00	\$	80,000.00		
embankment compaction	8000	су	\$	4.00	\$	32,000.00		
fine grade road	58000		\$	0.50	\$	29,000.00		
export	1600	cy	\$	6.00	\$	9,600.00		-
Sub-Total			Ť		-	0,000.00	\$	173,400.00
Paving and Concrete							Ť	770,100.00
Asphait 2"HMA 1/2" 58-22	1400	ton	\$	100.00	\$	140,000.00	-	
crushed rock 2"	1400	ton	\$	35.00	\$	49,000.00		
gravel base 6"	4000	ton	\$	28.00	\$	112,000.00		
concrete	400		\$	80.00	\$	32,000.00		
ADA Stall	2	ea	\$	2,000.00	S	4,000.00		
extruded asphalt curb	1200		\$	18.00	\$	21,600.00		
Sub-Total	1200	II .	Ψ	10.00	Ф	21,000.00	\$	358,600.00
Storm drainage			-		-	-	-D	330,000.00
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CB type 2 with duel riser	1		\$	5,000.00	\$	5,000.00		7
12" storm pipe (ADS N-12)	850	ea If	\$	35.00	\$	29,750.00	-	
					\$			
6" storm pipe (ADS N-12) tightline	225	lf	\$	19.00	<u> </u>	4,275.00	_	
rip-rap and headwall Sub-Total		ea	\$	1,000.00	\$	2,000.00	_	#E4 00E 00
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Erosion Control	4200	lf	•	6.00	•	7 000 00		
filter fence	1200		\$	6.00	\$	7,200.00	_	
quarry spall entrance	1	ea	\$	4,000.00	\$	4,000.00	_	
sediment trap rock	40		\$	25.00		1,000.00	_	
interceptor ditches	700		\$	1.00	\$	700.00	-	
hydroseeding	0.7	acres	\$	4,000.00	\$	2,800.00	•	45 700 00
Sub-Total			-		-		\$	15,700.00
Miscellaneous	400					5 000 50		
fencing	100		\$	50.00	\$	5,000.00		
misc traffic control		allowance	-	2,000.00	\$	2,000.00		
dry utility trench elec	200		\$	22.00	_	4,400.00		
landscaping		allowance	-	15,000.00	\$	15,000.00	_	
signage Sub-Total	U	allowance	\$	4,000.00	\$	-	\$	26,400.00
Overhead & Profit	10%	%		\$686,700.00	\$	68,670.00		
Sub-Total	1070				_	,	\$	68,670.00
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Sub-Total				4.0010100	Ť		\$	67,227.93
TOTAL						\$822,597.93	\$	822,597.93
note: For Phase I cost minus asphalt ar	nd concrete fr	om this est	ima	ite				
Does not include:								
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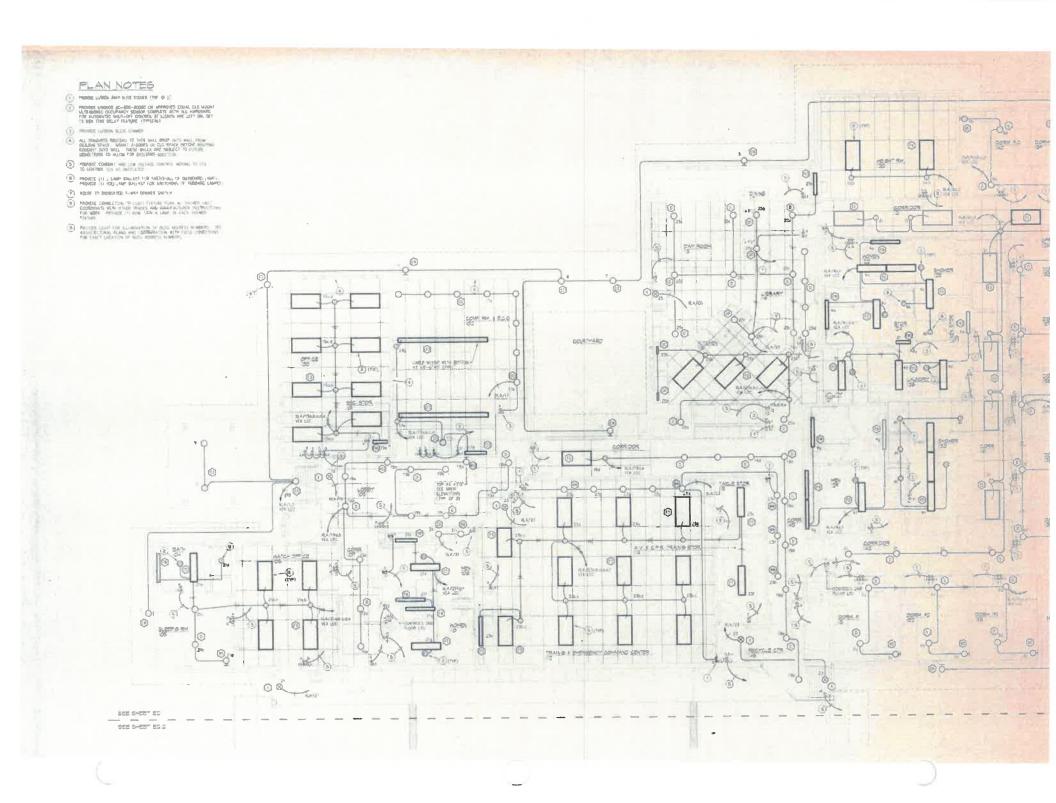
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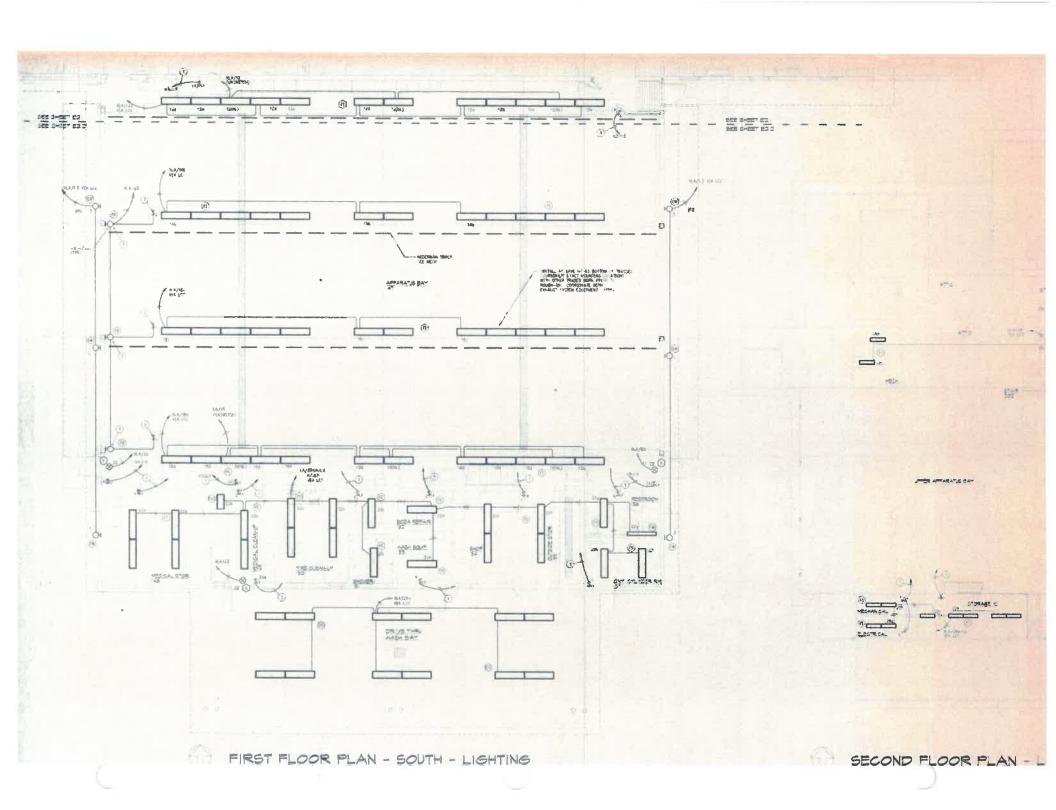
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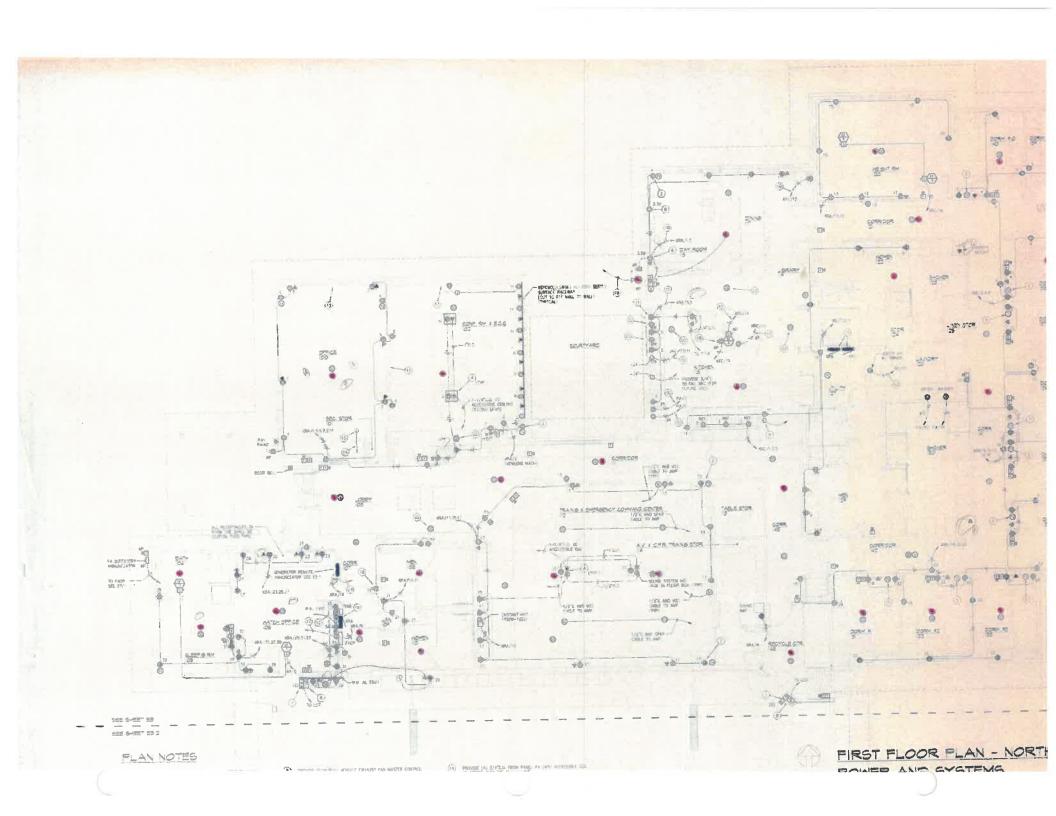
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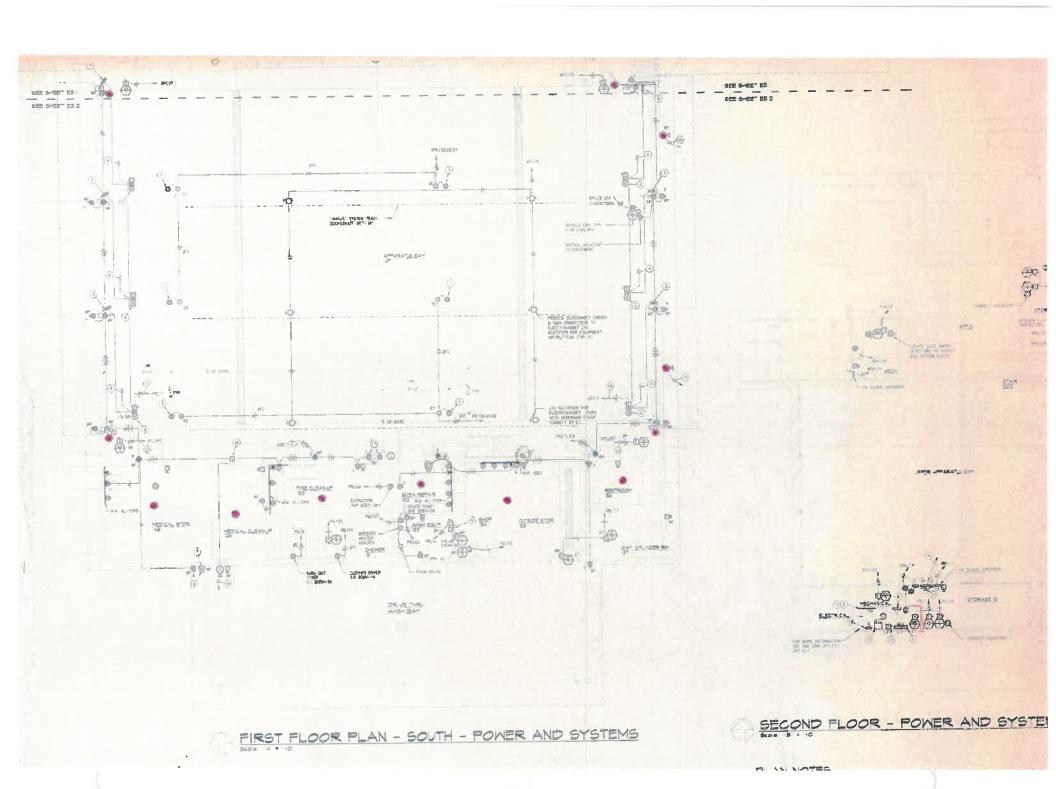
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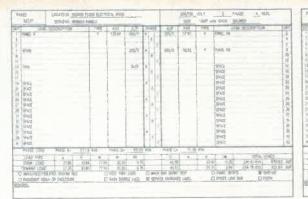
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5-1	LANAURY GROWTH WOMER, PROVI CHEFTIN, 1980/DS DAW, 10"11" N/ YOMAR & COLOR-MICHAEL REALIER, PARKET HALES ON A" CHIEFES, SIME-BOMMO, ARRICAN STANDON ON ON ON TO "ADMA" A ARRICAN STANDON ON ON ON TO "ADMA" A PACET, A" CONTROL WARE LIVER, MOSE SHAPA WHILE WITH OLS MY TUNN SAN'E WHOLE, MOSE "A" — DOWN HORSELS, THE WHOLE, MOSE "A" — DOWN HORSELS, THE HT 500% "-1/4" X 1-1/2" N-2004" SUPPLEY HID STIPPS.	140/30	111/05	1/2"	1/3*
[+3]	LINEAR -1-46, \$1-145, \$-1-50+ Sharks marks mo sides \$100000 \$-40-5-14 WILLIAM SAMMAD RECVER WIGGS 109, \$20 FENTION: MPT HANK EVMITTE CHELS NOT NAMED -DESILON A, MEE F FL. SEE FENTION: MPT HANK EVMITTE CHELSON NAMED -DESILON A, MEE F FL. SEE	1-1/3"	1-1/2	1/9"	12
55(m)	SERVICE, THIS P. CLUDAR, 20' 450' CORNERS, AGO RESISTANT, ENABLILLO CASÍ MPRE MARTÍCHE, ETALAGOR (7741,000' AUGUSTA). DORAN: STRUMER WE SOCIOTÀ ANGENCIA STADE VAN PER DO FAUCET: MALTAN MENAUTE, ADMENTALE ANDES WE'VE VEZIONAL 2015'S. DORACIÓ TALO SE	x	3"	3/4"	3/4"
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9+3	ANALOGY OF STATE AT THE CONTROL OF THE ATTEMPT OF T	Z*	>-\U3*	1/8"	1/17
BE-4	SWINDER FRITAIN. DOUBLE FERRITION. NEATH TARKE STREET, FURTHER, NORM HAR DECRATION & MARCH.— RESEARCH STREET, CHARLES CHARLES FRANCES FRANCES FRANCES FRANCES FOR THE STREET, AND THE STREET,	(e)Al'	5407	11/2"	
DF-4	HARDCAPPED DIRECTOR FOLITATE SERVER CONTINUE HEAVY GARDES STEET, THESTORISE, PLEAR BARD EMPERATION IS MORE TRESTAND TRANSLATE, CHARGE FA. 1875 "SECTION TAYLES, ANTIQUATES STRONG PRINCALITION, THE JUSTICAL THE ALL CONTINUES AND ACCOUNTY ANTER CONTROL PARTS ACCOUNT SECTION OF SOCIETY CONTINUES AND ACCOUNTY ANTER CONTROL PARTS ACCOUNTY SECTION OF SOCIETY CONTINUES AND ACCOUNTY ANTER CONTROL PARTS ACCOUNTY SECTION OF SOCIETY CONTINUES AND ACCOUNTY ANTER CONTROL PARTS ACCOUNTY SECTION OF SOCIETY SECTION AND ACCOUNTY AN	1-1/2	1-1/2"	100	
2-1	BOW, DOWNER COMPARISATION, NO GAME, PMP, 303 STRVE2S STRVE. 97 PM 207 TO MAKE, 3 25 LEFT TO MAKE 1 7 - 7,7 CHEM, MELT-MORBING, 2 CHEM, SAN	3"	1×1/2*	1/2"	1/1

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58+1	MEMOSTAT	SINO	SUPPLACE MOUNT, BOUND SOFTERMON, WITH SHIP	(9/%)
46-1/E-1	TARRONDINT	926,	CHI-St Tubble, Serial	RETURN
10-2/3-1	PREMIDETAT	365	809 ACE NODES, 12"V12"	RETURN
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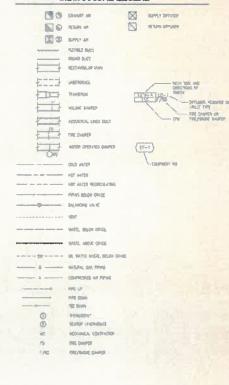
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FD-1	FLOOR BYMAN CAST MON BOST WITH ABOUSTHEE ROUND TOR, MIST-FLOOD ROU. TO DIRECTO MICKES STREAMED INTO RECUSSION, LOWIS COATS, MAY PRIMET COUNTED MICKES THE HEAD WAS BEEN AND RECUSSION, LOWIS COATS, MAY PRIMET ALL SHIPS DISCRESS—1-141-14508	X.	r	777	- To
10-1	FLOOR BRAIN: CAST WICH BERN WITH AULKTHALL BRUND PROJECTS WORLD WRITERS WERE STREETED BRAINTER ST. ONDS WILL-A SOLUTE WORLD WRITERS WITH BRUND WORLD WITH ST. P. THAP WERE BLUE PRODUCT CONTROL PRODUCT WITH P. THAP WERE BLUE P. TH	Z*	*		
10-3	PLOSE TENNY CAST NOW MORY WITH AND MESSTARY COLUMN STRING, MOVER, MICHEL MINERY, MOVE MAD DAY OF THE DRIVE MESSTARY OF THE MESSTARY OF THE STRING WORLD WITH THE MESSTARY OF THE STRING THE	F	Y		
10-1	PROTECT PRINT, SPAIL, ME LANCE OF PROCESS PAY THAT EXCHANGE WHILE AT THE WRITE AS A THE WRITE AS A SHARE AS A	4	r	147	and a
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36-3	BOOMER HAVER PLACES FLECTORS, 5 BRALLOW, BOLETS BYLAN HAVIN, 1980, 85 GPM MEGDESHY AT BY MESS BANKS, 1980, 1	ni-ma	-	3++	-
sgut	PATH BOOK MALL HYDHAD, MYN.—POESEE, DOPOSES, SOCIOES APPORATE SITE CHRONE. PLATES FACE, SHOWER CHRON. MOR MORE CORNECTION HYDE AVERSHAL MAJARA SHEAPEY """ MANDEL, GRANDE AS REQUIRED BY WALL INCOMESS. A S SHEN NOON.	(5.60)	***	376*	
4四-3	MOTE UND. BY LE STEWART, NOW-THERE, SPORES BUT HILL WITCHING WE'VE PLACED BROWN THE SERVICE DEPOSIT DRIVEN COMPANIES OF A THE COMPANIES WITH WITCH WALLEN BROWNERS. 4 N. SHEWN SCHOOL-PR	-	-		2/0
2231-1	DESIGNACY DOE WHILE SHEARY-TEXE FOR MAND, A DALIGH ELYMICIT, MARY OF HID-HAPACY POLICYMENIE, COUNTES WITH HEAVY DAILY HOUSING SHOULT AND EYEMBE SHE LAS SAFETY SHIPLY, MORE, NO. HE-TOPS		- ma	,aaa	-

MECHANICAL LEGEND



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CU-3	CARREN SEARCOOF-9	441-2	35	10.00	82.	100		
135-3	CARREN SECRESS-34	AND-3	36.1	28.1	199	100	18/1	100
Iti-ri	CAMADI - 5907060 - 54	ANTON	58.6	16.5	70.1	200	100	1

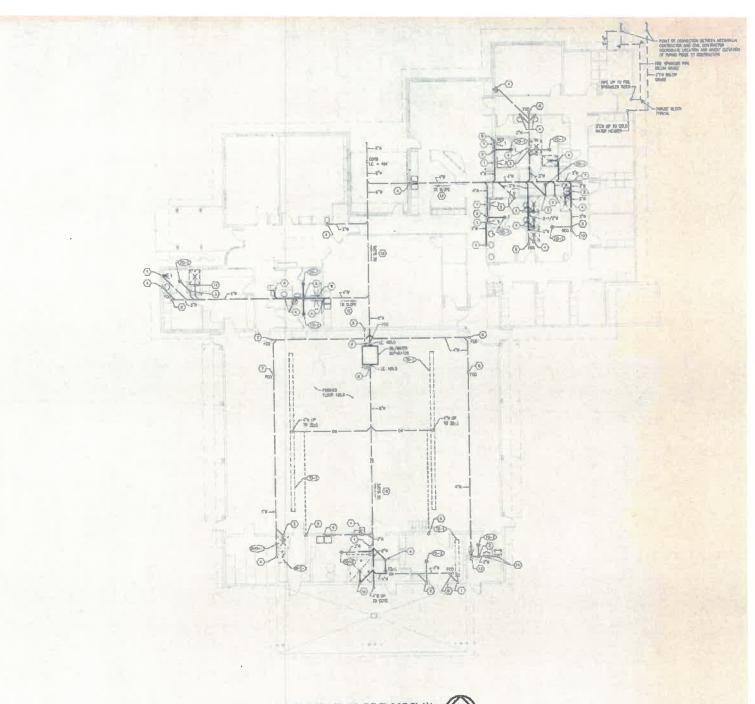
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⁽³⁾ CODDING COLS TO BE CHANGE HOME SHEM-DIE, MATCH DITTED THE MITTING CONFESSER UNTE AND
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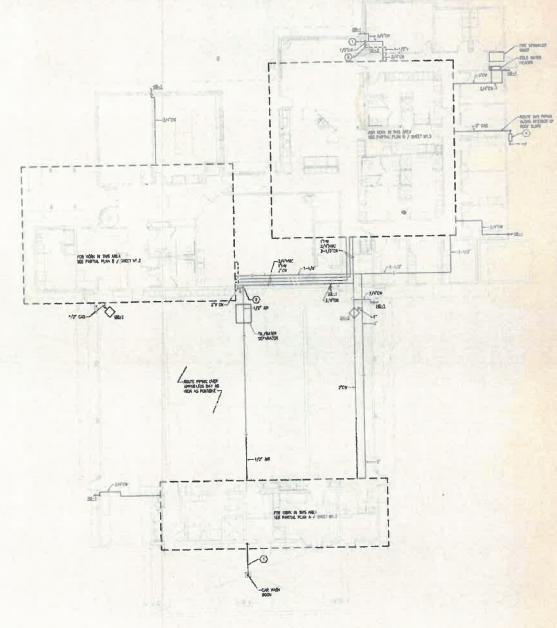
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⁽²⁾ HID-S ID IN HEATING DIAY



PLUMBING BELOW GRADE FLOOR PLAN





GENERAL NOTES

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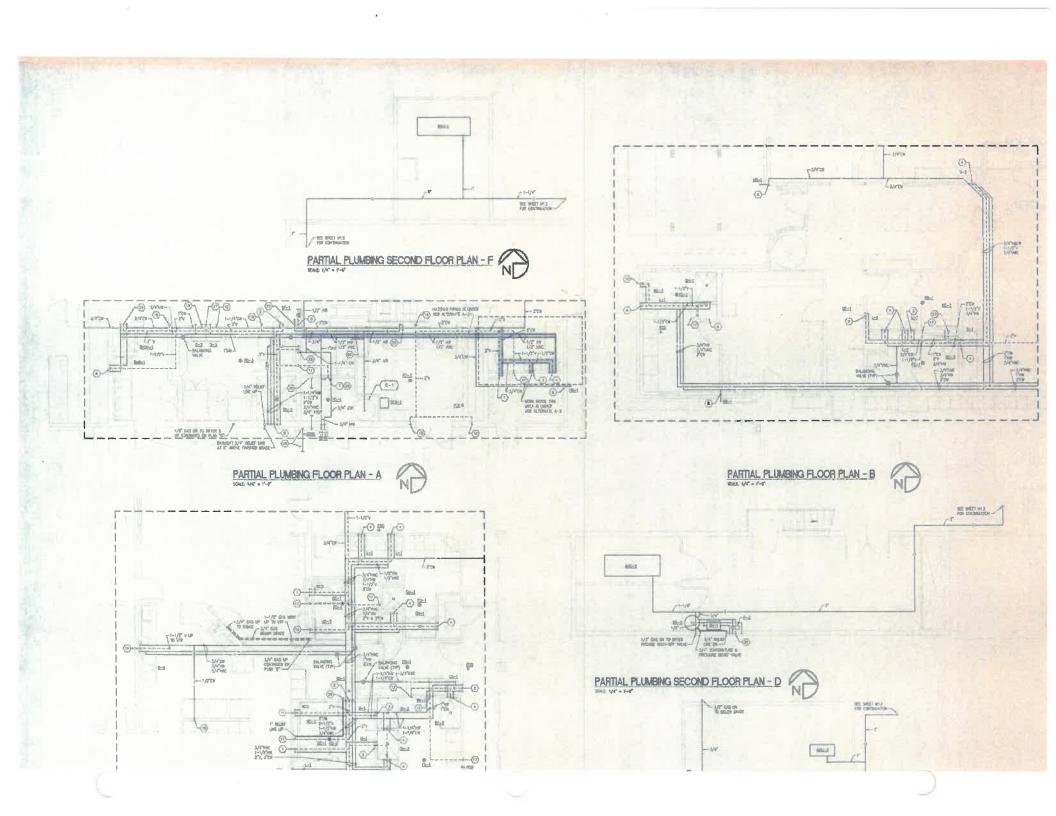
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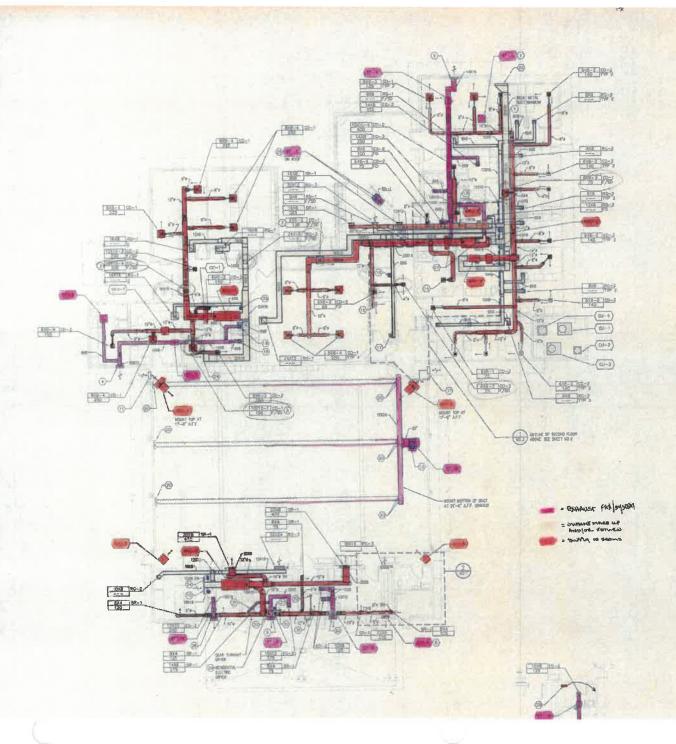
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PLUMBING FLOOR PLAN







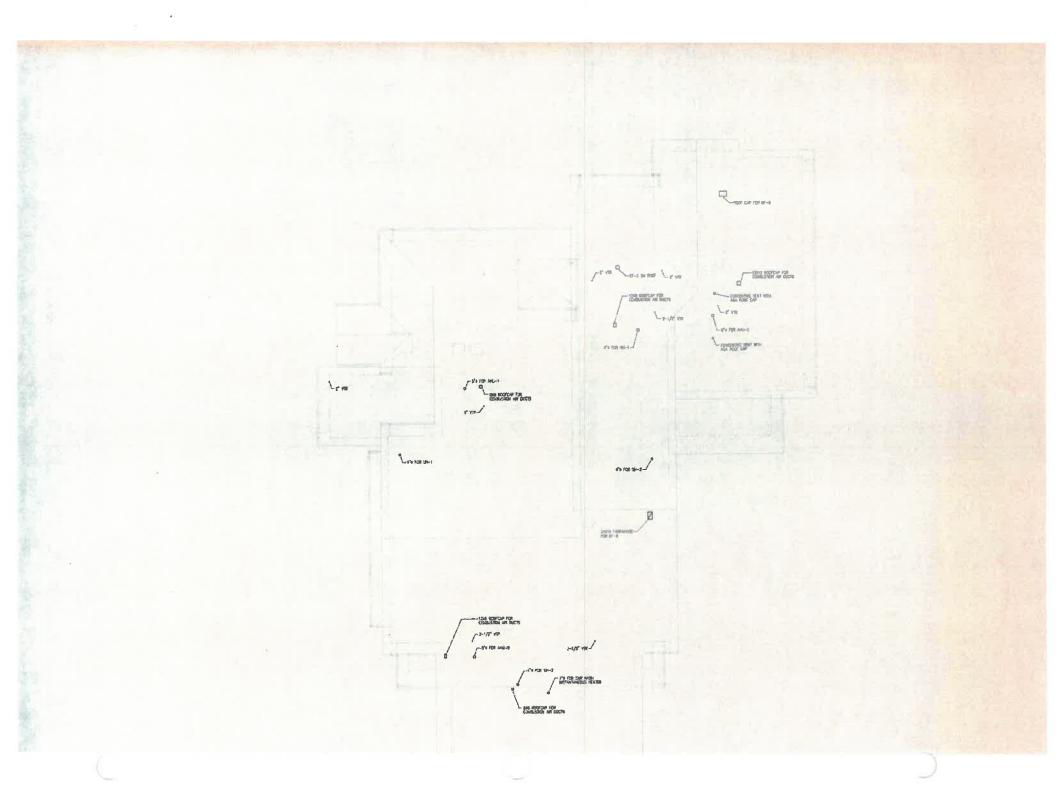
GENERAL NOTES

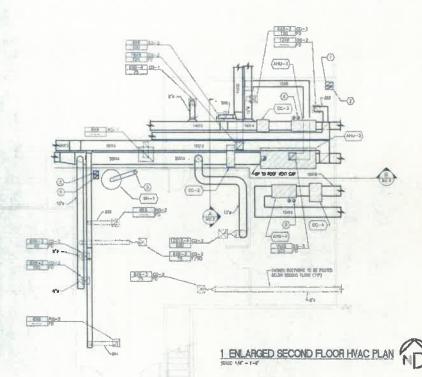
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GENERAL NOTES

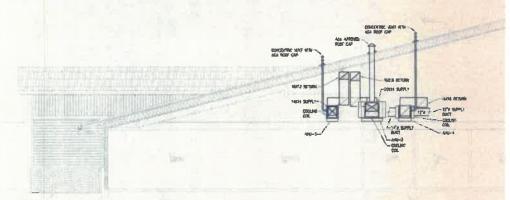
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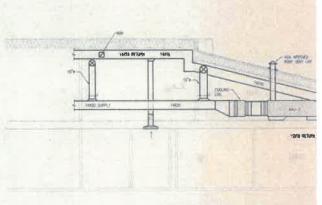
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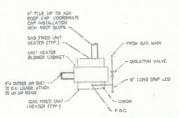
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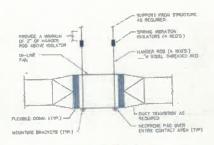
MECHANICAL BUILDING SECTION A



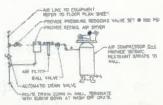
MECHANICAL BUILDING SECTION B



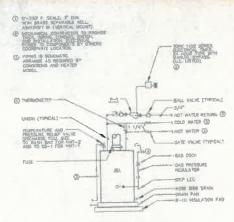
GAS AND DUCTWORK CONNECTION DETAIL- UNIT HEATER



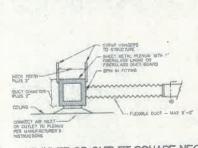
5 IN-LINE FAN DETAIL



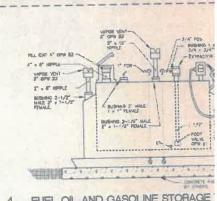
AIR COMPRESSOR DETAIL



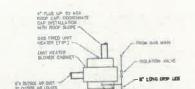
WATER HEATER DETAIL



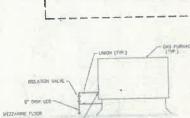
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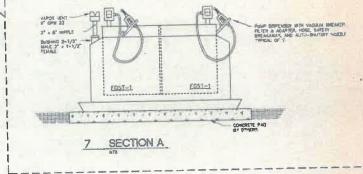
FUEL OIL AND GASOLINE STORAGE

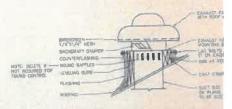


GAS AND DUCTWORK CONNECTION DETAIL- UNIT HEATER

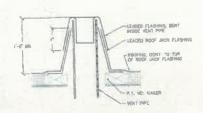


GAS CONNECTION DETAIL-GAS FURNACE HOS TO BOALT

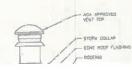




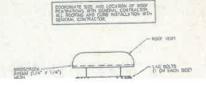
ROOF EXHAUST FAN



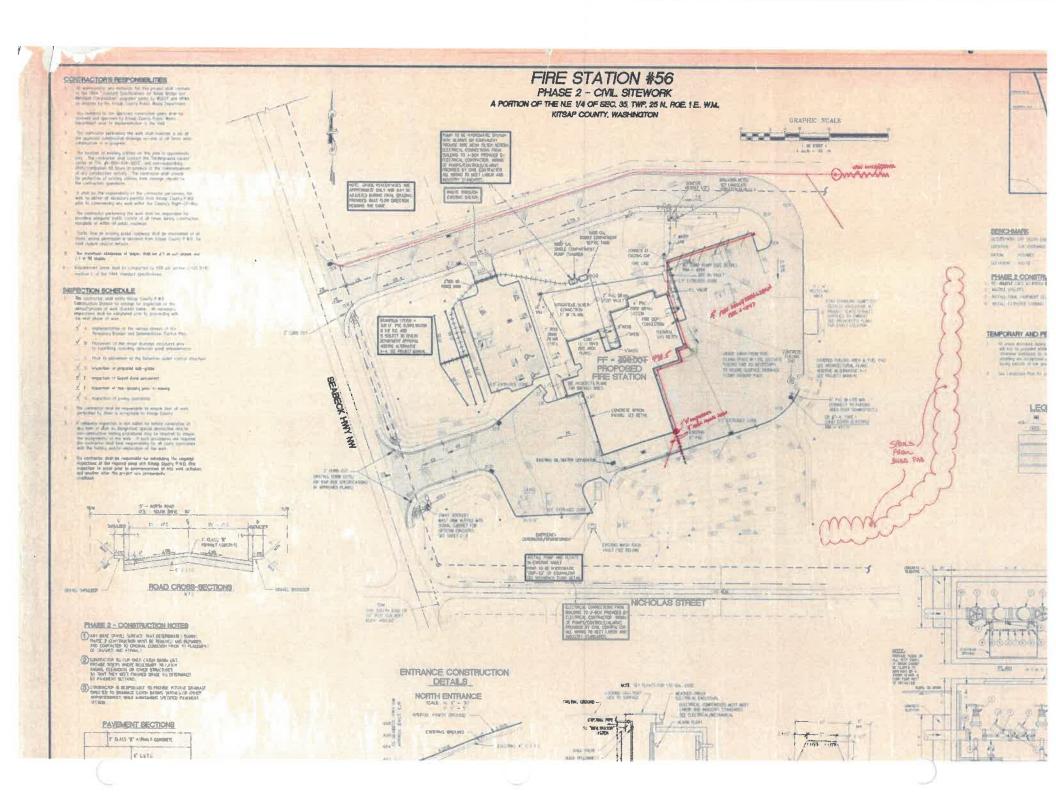
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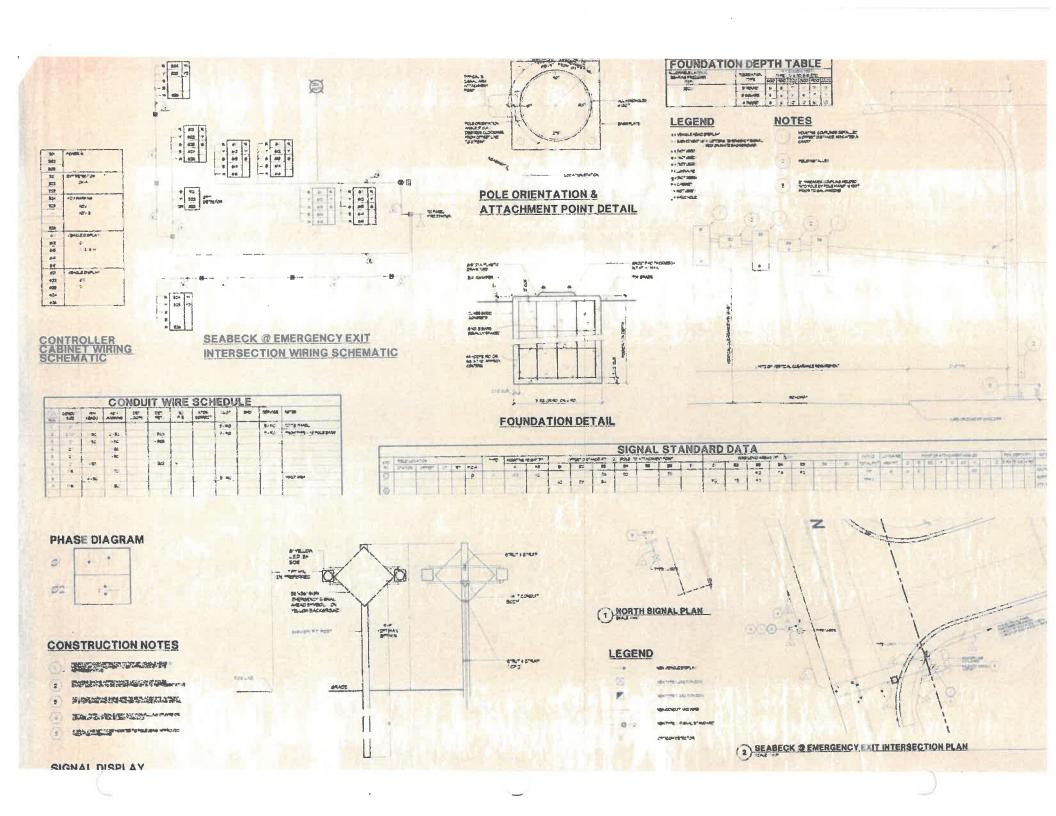


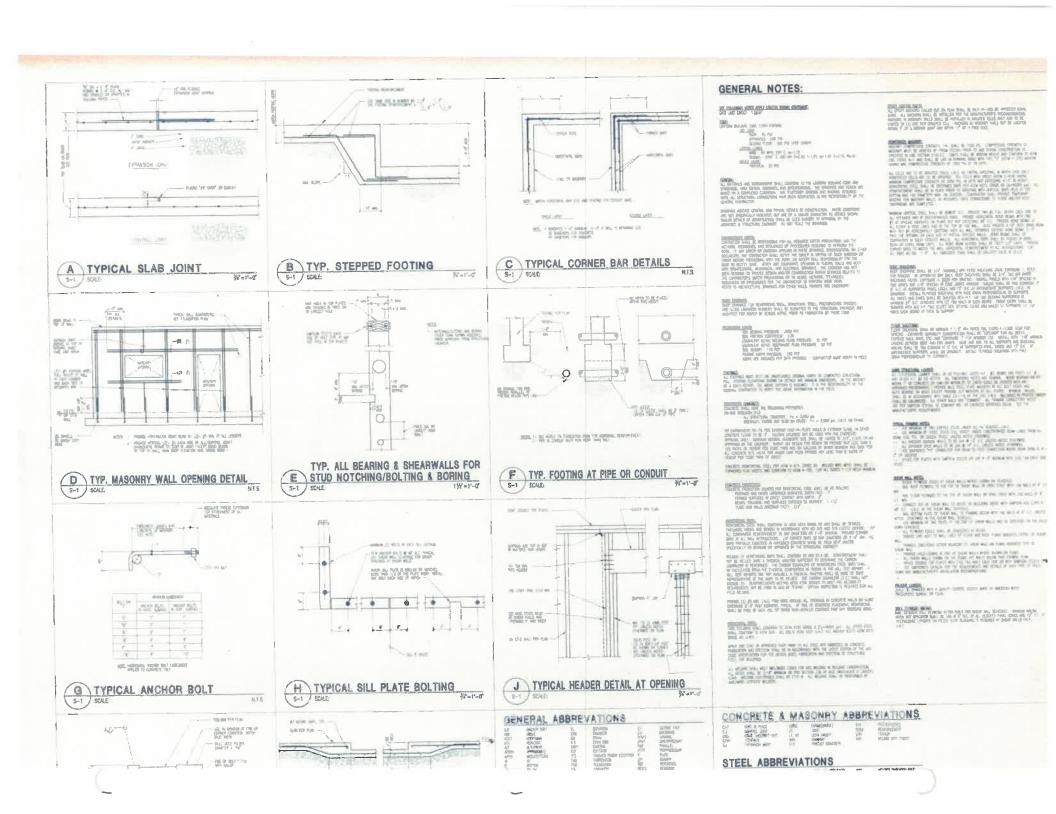
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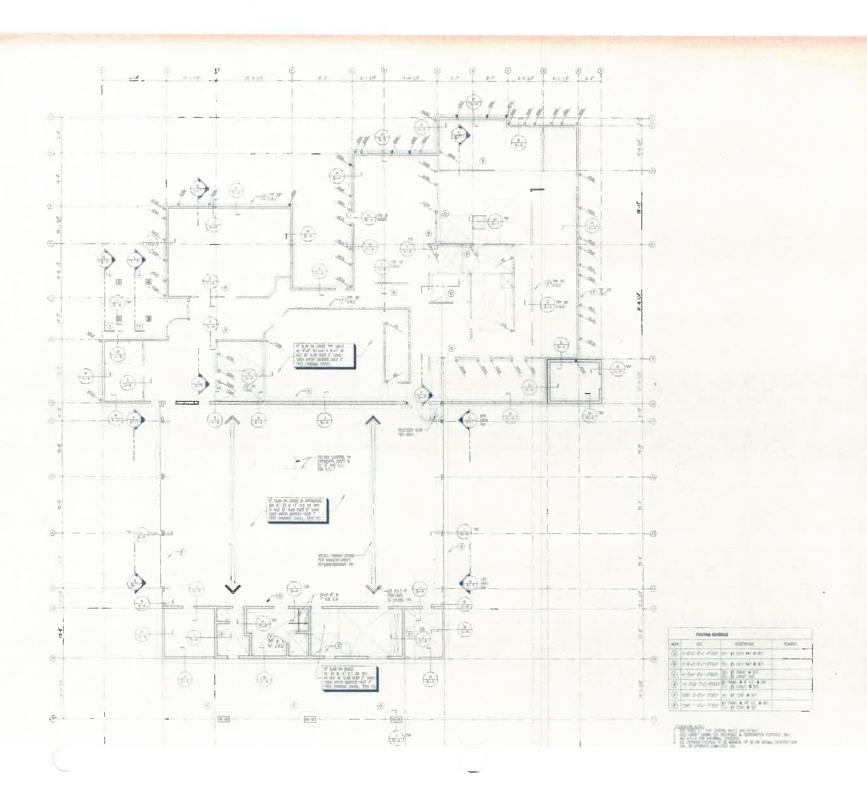


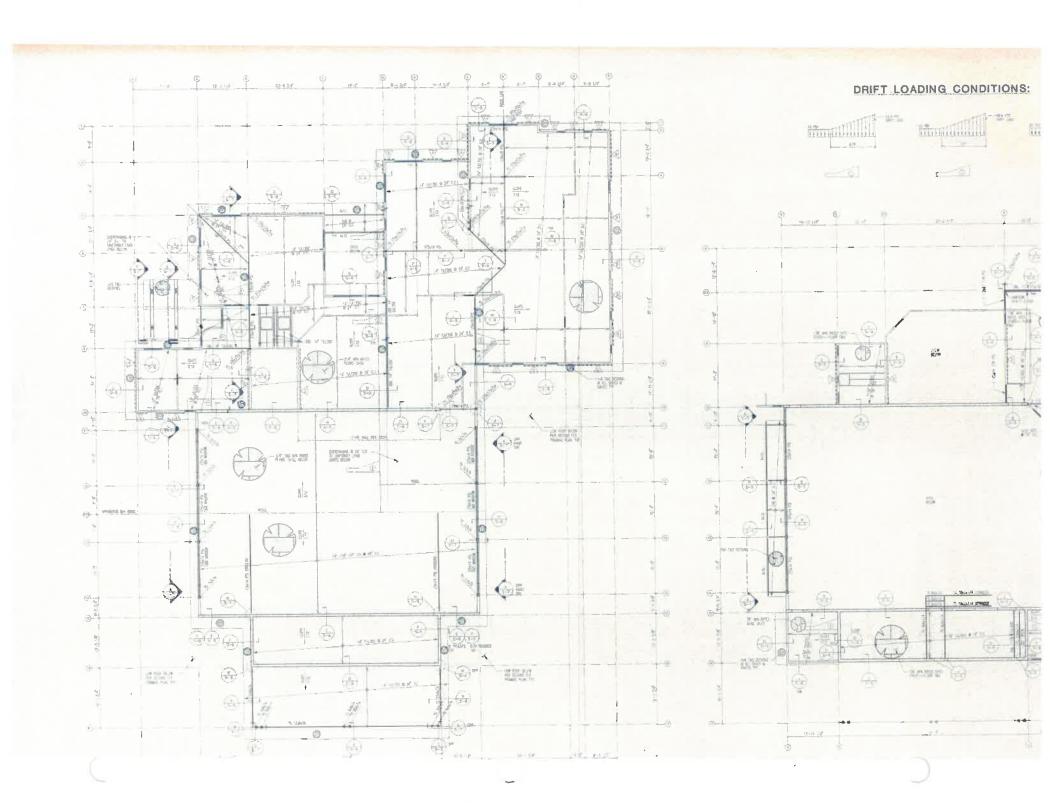
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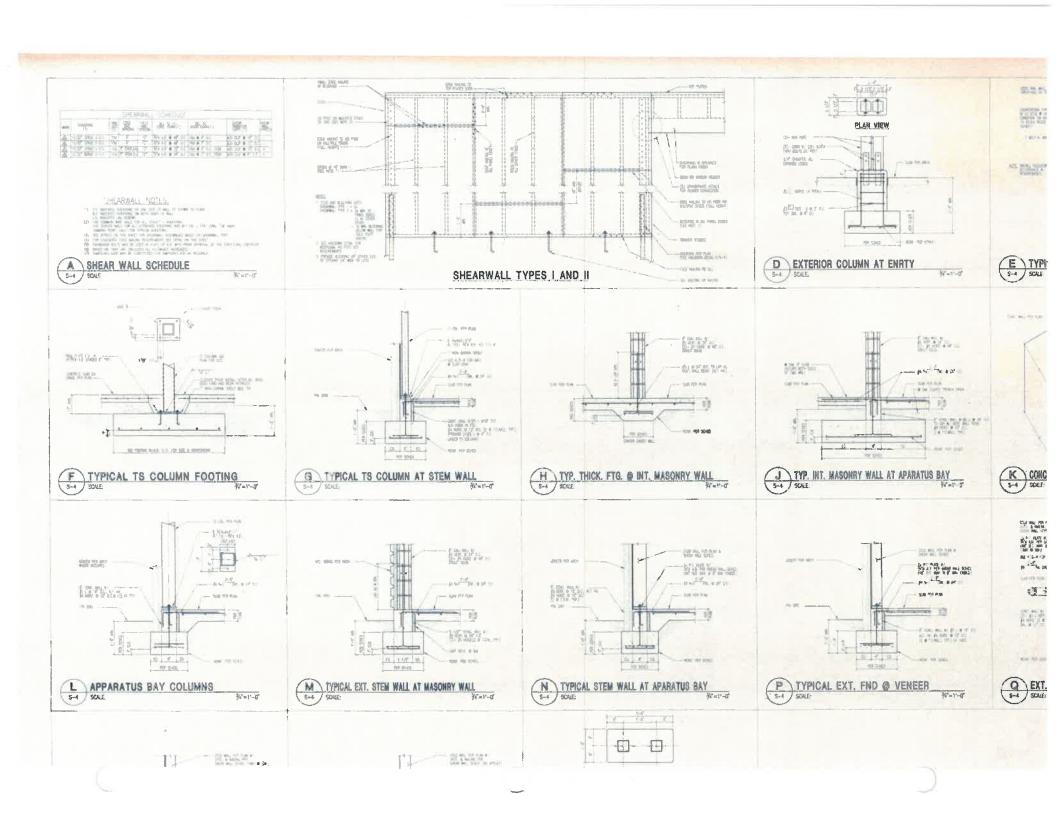


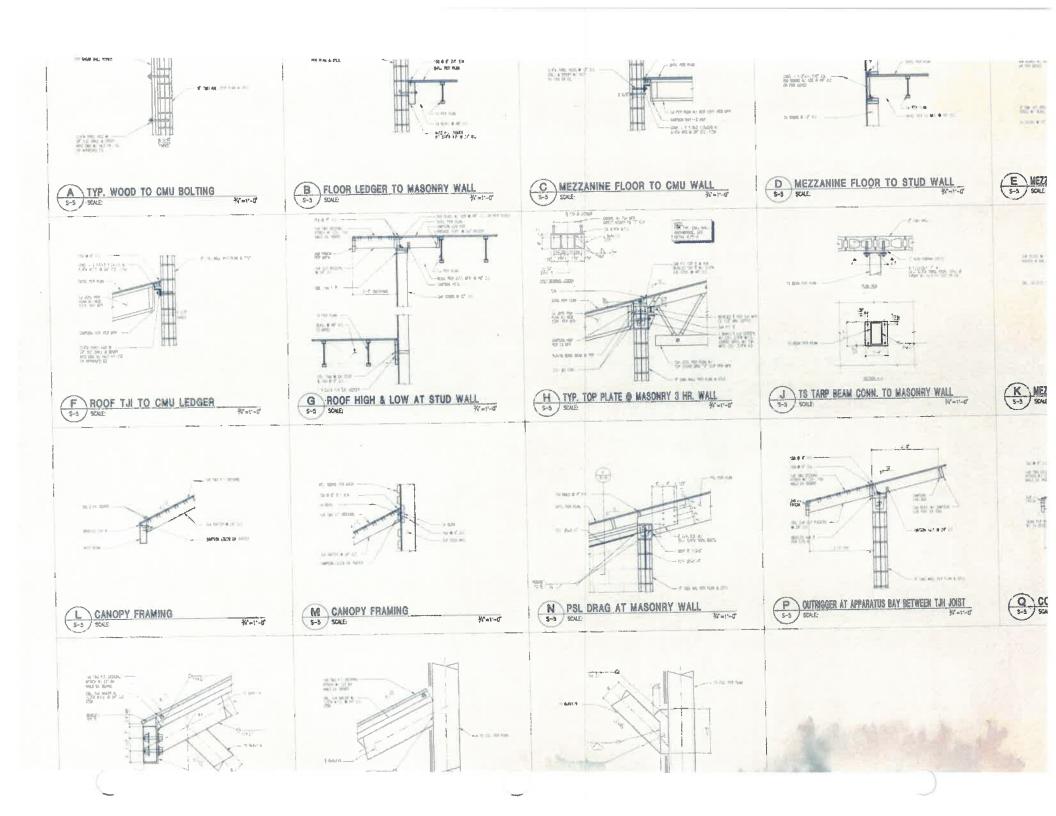


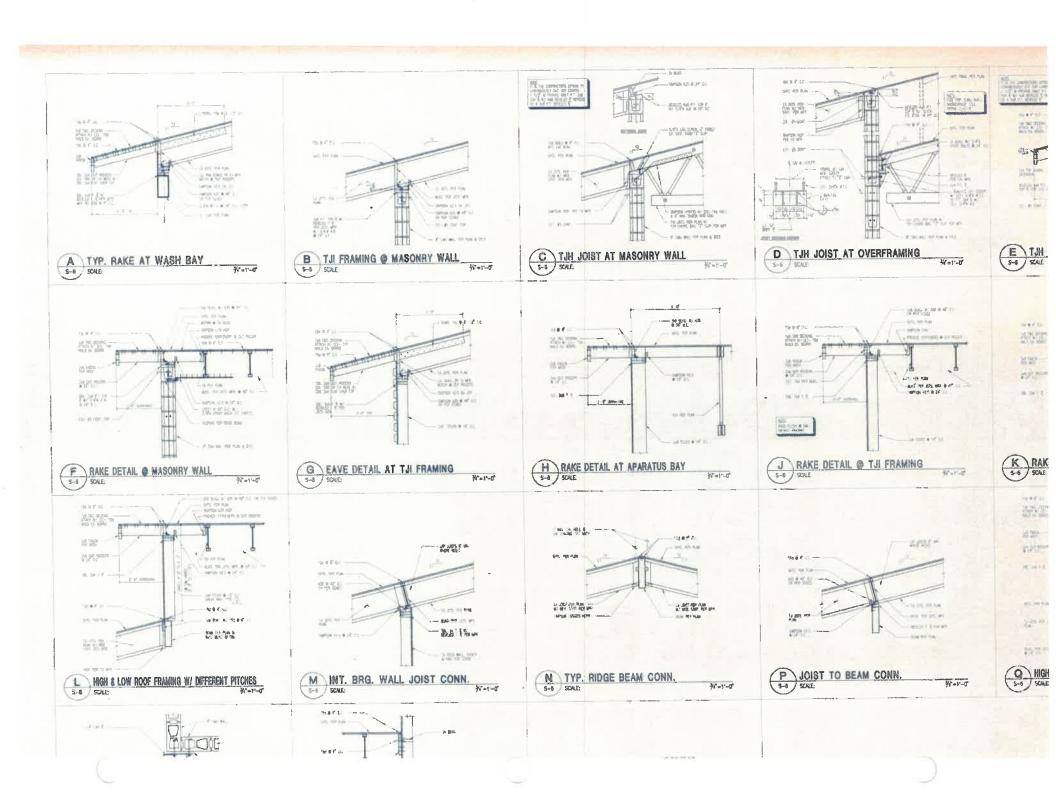


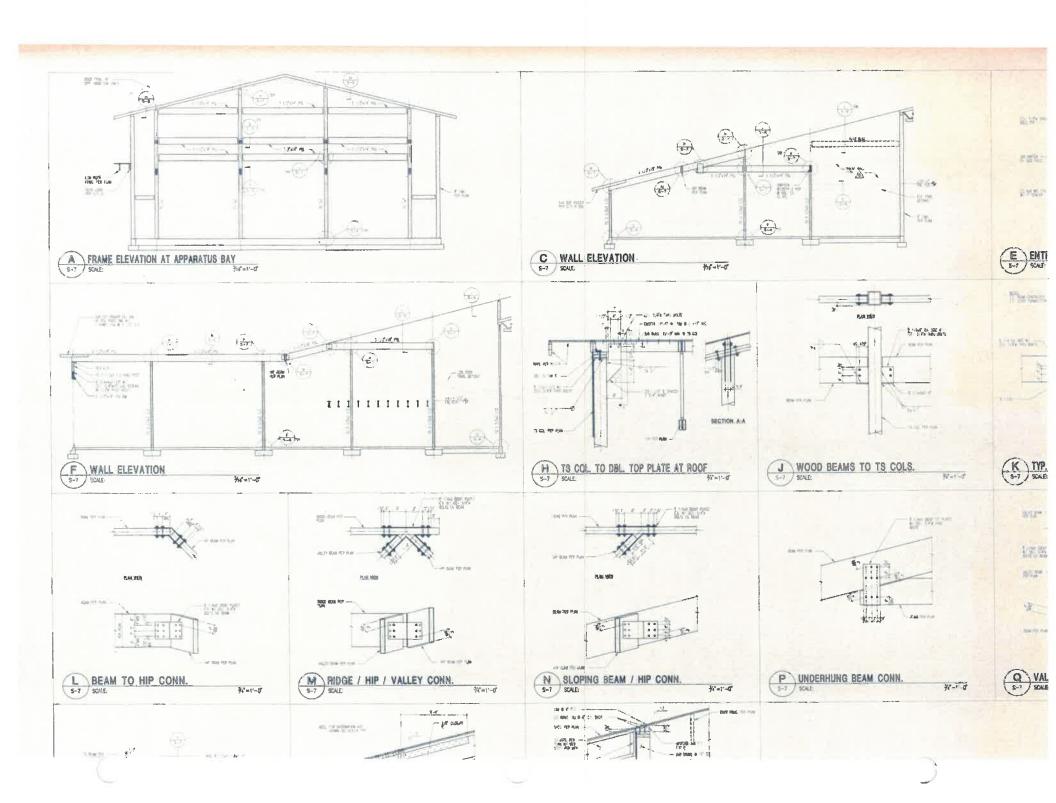














Fire Station 57 - Coho Run

In 2005, CKFR hired Emergency Services Consulting, Inc. (ESCi) to undertake a Response Planning and Performance Analysis with the purpose of mapping incident locations, finding the density of those emergency calls, and determining the travel times to respond to them. ESCi reported that, overall, CKFR's stations were well placed to respond to the call volumes at that time, however, an emerging area of call concentration was identified in the Camp Union area of the District.



Property for Fire Station 57 – Coho Run NW Holy Rd & Coho Run, Camp Union, WA 98380

In 2006, CKFR pursued acquisition of a parcel at the intersection of NW Holly Rd and Coho Run as recommended by ESCi to improve their response performance in that area. The District undertook a preliminary geotechnical investigation and civil engineering assessment. Station programming and planning led to a decision by the CKFR Board of Commissioners to purchase the property.

With rising construction costs and uncertainty in the national economy, CKFR elected to keep this project in their long-range facility plans but defer its construction until a later time.

Call volume and density in this area of the District have increased since 2006 to sufficiently justify construction of this new station.

Proposed Improvements

During 2018 and 2019, the District refreshed and updated the planning reports and documents previously prepared. The District validated the programmatic requirements for this station, updated the design drawings, and commissioned a new cost estimate.

The design for Station 57 will be the District's "prototype" plan. That plan calls for living quarters to accommodate four firefighters, three single deep apparatus bays, work areas, and a small public lobby. The station will be approximately 8,800 square feet in size.

These improvements are estimated to cost \$6,042,635.00, plus project expenses.

End of Fire Station 57 - Coho Run





Program Requirements

Prototype Fire Station Program Requ	irements					
		Fire	Fire	Fire	Fire	Fire
		Station	Station	Station	Station	Station
		42	45	52	53	57
		island Lake	North Perry	Anderson Hill	Seabeck	Coho Run
Operations	1					
Apparatus Bay (3-bays, back-in)	54' x 50'	2,700	2,700	2,700	2,700	2,700
Decon	10' x 11'	110	110	110	110	110
Shop	8' x 10'	80	80	80	80	80
Clean Project Room	16' x 12'6"	200	200	200	200	200
App Bay Restroom	8' x 12'	96	96	96	96	96
Bunker Gear Storage	15' x 21'	315	315	315	315	315
General Storage	8" x 10"	80	80	80	80	80
App Bay Janitorial	8' x 8'	64	64	64	64	64
Sprinkler Riser / Compressor	6" x 10"	60	60	60	60	60
Living Quarters	·					1
(4) Sleep Rooms	(4) 9' x 15'	540	540	540	540	540
(2) Restroom/Showers	(2) 8' x 12'	192	192	192	192	192
Kitchen	14' x 20'	280	280	280	280	280
Dining for 6	16' x 14'	224	224	224	224	224
Dayroom for 4	16' x 19'	304	304	304	304	304
Fitness	24' x 20'	480	480	480	480	480
Laundry	10' x 12'	120	120	120	120	120
Janitorial	. 8'x8' [64	64	64	64	64
Public and Front of the House						
Public Lobby	8' x 12'	96	96	96	96	96
(1) Public Unisex Restroom	8' x 8"	64	64	64	64	64
Firefighter Work Area	18' x 20'	360	360	360	360	360
Station Officer Office	10' x 10'	100	100	100	100	100
Subtotal		6,529	6,529	6,529	6,529	6,529
Mechanical / Electrical	10%	653	653	653	653	653
Circulation	15%	979	979	979	979	979
Total Anticipated Square Fo	otage	8,161	8,161	8,161	8,161	8,161

End of Program Requirements





PACTOR OF PASSING VIELAS
ARCHITECTURE PASSING VIELAS
275 FIFTH STREET, SUITE 100
BREMERTON, WA 98337
B90-377-877
RFMARCH.COM

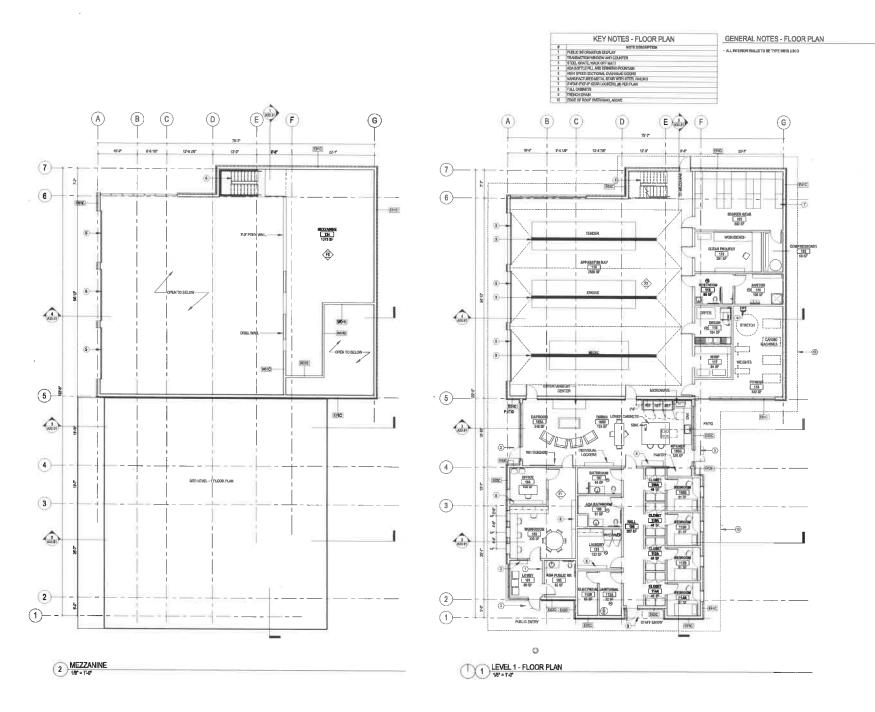
NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE AND RESCUE
COHO RUN STATION
Enter address here

PROJECT#	2017000.0
PROJE	CT STATUS
SSUE DATE	JANUARY 1, 20
REVINO	ON OCHEDULE
-	

ARCHITECTURAL SITE PLAN

A10.01



RICEJergusMILLER

275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 360-377-9773 RFMARCH.COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE NEW STATION: MODEL



A21.11



STATION 57 (PROTO)



STATION 57 (PROTO)



Central Kitsap Fire and Rescue Bond Study 11/1/2019

Station 57-Coho Run

Protoypical New Bldg. Station 57 \$ 4,355,419
Site Work Station 57 \$ 1,070,862

Total direct Today's Dollars \$ 5,426,281

Exclusions:

Escalation
State Sales Tax
Construction Contingency
Architect/Engineering Fees
Permits

Toxic Soils/Materials Removal Construction Management Fees Utility Infrastructure to Site Piling/Special Foundations Wetland Mitigation Jurisdictional/Utility Co. Fees Owner's Consultant Costs Equipment & Furnishings Not Listed
Off Site Work
Builders Risk Insurance
Moving/Relocation Expense
Alternative Delivery-GC/CM, Design-Build
Legal Expense
Land Purchase/Financing Costs
Fire Vehicles/Apparatus/Radio Towers
Project/Bid Market/Code Change Contingency



Prototypical New Building Summary

Gross Floor Area: 8,800 SF Rates Current At September 2019

Desc	ription		Cost/SF	Total Cost
A10	Foundations		\$27.38	\$240,907
B10	Superstructure		\$39.75	\$349,760
B20	Exterior Enclosure		\$78.60	\$691,695
B30	Roofing		\$34.62	\$304,670
C10	Interior Construction		\$27.62	\$243,086
C20	Stairs		\$2.84	\$25,000
C30	Interior Finishes		\$23.51	\$206,887
D20			\$34.00	\$200,887 \$299,200
	Plumbing			
D30	HVAC		\$43.00	\$378,400
D40	Fire Protection		\$6.80	\$59,840
D50	Electrical		\$43.50	\$382,800
E10	Equipment		\$7.88	\$69,355
E20	Furnishings		\$12.49	\$109,898
Z10	General Conditions		\$48.30	\$425,000
		ESTIMATED NET COST	\$430.28	\$3,786,498
MAR	GINS & ADJUSTMENTS			
Desid	n Contingency-Building	7.0 %		\$265,055
1	actors Overhead & Profit	7.5 %		\$303,866
		ESTIMATED TOTAL COST	\$494.93	\$4,355,419

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cos
A1010	Standard Foundations				
1	Standard foundation excavation,backfill,haul off	SF	8,800	1.50	13,20
2	Footing drains w/gravel	LF	415	20.00	8,30
3	Add for lateral system footings	EA	4	2,500.00	10,00
4	Continuous footings at exterior	CY	30	550.00	16,66
5	Continuous footings interior	CY	8	550.00	4,18
6	Column footing allowance	CY	34	460.00	15,82
8	Stem walls	SF	1,225	46.00	56,35
9	Waterproofing foundation	SF	1,415	5.85	8,27
	Standard Foundation	s		\$15.09/SF	\$132,79
A1030	Slab on Grade				
10	Gravel at slab on grade	SF	8,800	0.70	6,16
11	Trench drains @ App bay	LF	103	185.00	19,05
12	8" slab on grade-App Bay	SF	2,830	8.50	24,05
13	4" slab on grade-balance of bldg.	SF	5,970	6.35	37,91
14	Rebar at 8" slab-#5 @ 14" O.C.	Lb	5,822	1.70	9,89
15	Slab depressions, block-outs and columns closures	SF	8,800	0.40	3,52
16	Rigid insulation @ slab perimeter	SF	1,038	3.00	3,11
17	Vapor retarder @ slab	SF	8,800	0.50	4,40
	Slab on Grad	e		\$12.29/SF	\$108,11
B1020	Roof Construction				
20	Gang nail truss, TJI, plywood roof structure	SF	10,930	32.00	349,76
24	Fireproofing at roof structure	LS	1		Exc
	Roof Construction	n		\$39.75/SF	\$349,76
B2010	Exterior Walls				
27	Ext wall frame @ openings, glazing areas	SF	2,307	8.00	18,45
28	Exterior wall framing system-insul,sheath,gwb,wrb,clips	SF	6,319	30.35	191,78
29	Misc. flash,trim,seal,caulk exterior wall envelope and screens	SF	8,626	2.65	22,85
30	Red Fiber Cement Siding	SF	2,636	24.00	63,26
31	Wood siding	SF	2,044	24.00	49,05
32	Precast-base perimeter & public entry	SF	1,639	52.00	85,22
279	Ext. signage	LS	1	25,000.00	25,00
	Exterior Wall			\$51.78/SF	\$455,64

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descrip	otion	Unit	Qty	Rate	Total Cost
B2020	Exterior Windows				
35	Ext. glazing systems	SF	1,614	75.00	121,050
	Exterior Windows		,-	\$13.76/SF	\$121,050
D				•	
B2030	Exterior Doors	_ ^	•	00 000 00	00.000
36	High speed overhead sectional doors	EA	3	30,000.00	90,000
39	Exterior doors/frames/hardware-per leaf	EA	5	3,000.00	15,000
40	Misc. exterior door hardware/card/electric	LS	1	10,000.00	10,000
	Exterior Doors			\$13.07/SF	\$115,000
B3010	Roof Coverings				
44	Membrane roofing system	SF	10,930	18.35	200,566
45	Roofing rough carpentry	SF	10,930	0.65	7,105
46	Roof flashing,coping,sheet metal,	SF	10,930	2.05	22,407
47	Fall protection system	SF	10,930	1.00	10,930
48	Misc roofing accessories, hatch, walkpads, ladders	SF	10,930	0.55	6,012
49	Cladding/work at overhangs	SF	2,130	20.00	42,600
264	Metal caps at roof beams	EA	86	175.00	15,050
	Roof Coverings			\$34.62/SF	\$304,670
C1010	Partitions				
50	Interior partitions	SF	10,095	13.55	136,790
52	Add for interior partition types,ratings	SF	6,562	3.50	22,966
266	Drill Wall/pony wall	SF	162	25.00	4,050
280	Transaction window and int. relite allowance	LS	1	5,000.00	5,000
	Partitions -			\$19.18/SF	\$168,806
C1020	Interior Doors				
53	Pocket door	EA	1	2,100.00	2,100
55	Int. HM door/frame/hdwre-per leaf	EA	23	2,000.00	46,000
57	Misc. door hardware/ratings/readers	LS	1	5,500.00	5,500
	Interior Doors			\$6.09/SF	\$53,600
C1030	Specialties				
58	Specialties allowance	SF	8,800	2.35	20,680
	Specialties		· ·	\$2.35/SF	\$20,680
C2010	Stair Construction				
274	Stair/rails to mezzanine	LS	1	25,000.00	25,000
	Stair Construction			\$2.84/SF	\$25,000

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
C3010	Wall Finishes				
60	Interior Painting/sealing	SF	8,800	3.55	31,240
61	Wall protection at apparatus bay walls 8'	SF	1,040	12.00	12,480
62	Ceramic tile wall restrooms/showers	SF	1,485	22.00	32,670
63	Epoxy wall coating at decon and wash alcove-allow 8'	SF	328	16.00	5,248
281	Plam wall janitor rooms	SF	612	9.00	5,508
	Wall Finishes			\$9.90/SF	\$87,146
C3020	Floor Finishes				
66	Floor grates	LS	1	2,500.00	2,500
67	Athletic flooring-fitness room	SF	391	12.00	4,688
68	Polished concrete flooring	SF	7,867	7.50	59,006
69	Epoxy flooring-decon and wash alcove room-allow	SF	192	16.00	3,072
71	Rubber base allowance	SF	8,800	0.40	3,520
72	Ceramic tile base	LF	125	22.00	2,750
268	Ceramic tile flooring	SF	349	22.00	7,671
	Floor Finishes			\$9.46/SF	\$83,207
C3030	Ceiling Finishes				
73	ACT ceilings @ sleep rooms	SF	394	6.50	2,561
74	GWB ceilings-at restrooms/showers	SF	349	12.00	4,188
75	Acoustical cloud @ dayroom	SF	496	30.00	14,880
76	Ceilings-open to structure/seal-paint	SF	8,057	1.85	14,905
	Ceiling Finishes			\$4.15/SF	\$36,534
D2010	Plumbing Fixtures				
77	Plumbing allowance	SF	8,800	34.00	299,200
	Plumbing Fixtures			\$34.00/SF	\$299,200
D3090	Other HVAC Systems and Equipment				
78	HVAC allowance	SF	8,800	43.00	378,400
	Other HVAC Systems and Equipment			\$43.00/SF	\$378,400
D4040	Sprinklers				
79	Fire protection-allowance	SF	8,800	6.80	59,840
	Sprinklers		•	\$6.80/SF	\$59,840
D5090	Other Electrical Services				
80	Building electrical-allowance	SF	8,800	43.50	382,800
	Other Electrical Services		- ,	\$43.50/SF	\$382,800

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Prototypical New Building Detail

Gross Floor Area: 8,800 SF Rates Current At September 2019

Description		Unit	Qty	Rate	Total Cost	
E1090	Other Equipment					
81	Extractor/dryer		LS	1	28,500.00	28,500
82	Dishwasher		EA	1	1,500.00	1,500
83	Refrigerator/Freezer		EA	3	3,600.00	10,800
84	Range/oven/hood		LS	1	9,800.00	9,800
85	Bunker gear lockers		EA	15	545.00	8,175
86	Cascade fill station-FOIC		LS	1	2,500.00	2,500
87	Hose dryers-FOIO		LS	1		Excl.
88	Misc. equipment/FOIC		SF	8,800	0.35	3,080
273	Washer/Dryer		EA	2	2,500.00	5,000
		Other Equipment			\$7.88/SF	\$69,355
E2010	Fixed Furnishings					
89	Shift lockers		EA	16	1,200.00	19,200
98	Window treatment/shades		SF	1,614	9.85	15,898
99	Casework allowance		SF	8,800	8.50	74,800
		Fixed Furnishings			\$12.49/SF	\$109,898
Z1010	General Conditions					
177	General conditions		Mth	10	42,500.00	425,000
		General Conditions			\$48.30/SF	\$425,000
		ESTIMATED NET COST			\$430.28/SF	\$3,786,498

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Station 57 Site Work Summary

Onsite area bounded construction limits: 60,820 SF Rates Current At September 2019

Description		Cost/SF	Total Cost
G10 Site Preparations		\$2.50	\$152,050
G20 Site Improvements		\$5.97	\$363,076
G30 Site Civil/Mechanical Utilities		\$1.97	\$120,000
G40 Site Electrical Utilities		\$1.81	\$110,000
Z10 General Conditions		\$1.40	\$85,000
	ESTIMATED NET COST	\$13.65	\$830,126
MARGINS & ADJUSTMENTS			
Design Contingency-Site	20.0 %		\$166,025
Contractors Overhead & Profit	7.5 %		\$74,711
	ESTIMATED TOTAL COST	\$17.61	\$1,070,862

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Station 57 Site Work Detail

Onsite area bounded construction limits: 60,820 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
G1010	Site Clearing				
100	Site clearing, hard surface demolition, misc. demoltion	SF	60,820	0.50	30,410
	Site Clea	aring		\$0.50/SF	\$30,410
G1030	Site Earthwork				
108	Temporary Erosion Control	SF	60,820	0.50	30,410
109	General subgrade/shape/ finegrade	SF	60,820	1.50	91,230
	Site Earth	work		\$2.00/SF	\$121,640
G2020	Parking Lots				
115	Wheel stops allow	EA	11	125.00	1,375
116	App Bay drive/court-heavy paving	SF	5,200	6.00	31,200
117	Asphalt parking/drive area	SF	6,454	3.80	24,525
119	Curbs-mix cip/asphalt	LF	600	15.00	9,000
120	Striping, signage, detectable warning	SF	11,654	0.35	4,079
	Parking	Lots		\$1.15/SF	\$70,179
G2030	Pedestrian Paving				
121	Sidewalk/patio on site	SF	1,980	6.85	13,563
	Pedestrian Pa	ving		\$0.22/SF	\$13,563
G2040	Site Development				
124	Trash enclosure - pad & encloure-allow	SF	572	45.00	25,740
125	Fence/gates-allow	LF	175	155.00	27,125
127	Rock wall	SF	1,800	40.00	72,000
128	Generator/transformer enclosure	LS	1	25,204.00	25,204
129	Misc. bollards-allow	EA	6	1,200.00	7,200
130	Station monument sign/exterior signage-in bldg cost	LS	1		Excl.
131	Misc site furnishings/bench seating	LS	1	35,000.00	35,000
132	Flagpole	EA	1	3,000.00	3,000
	Site Develop	ment		\$3.21/SF	\$195,269
G2050	Landcaping				
282	Lanscape/irrigation-70%lawn/30%shrubs-trees	SF	38,386	2.19	84,065
	Landca	ping		\$1.38/SF	\$84,065
G3010	Water Supply				
145	Water system allowance-fire and domestic	LS	1	25,000.00	25,000
		ipply		\$0.41/SF	\$25,000

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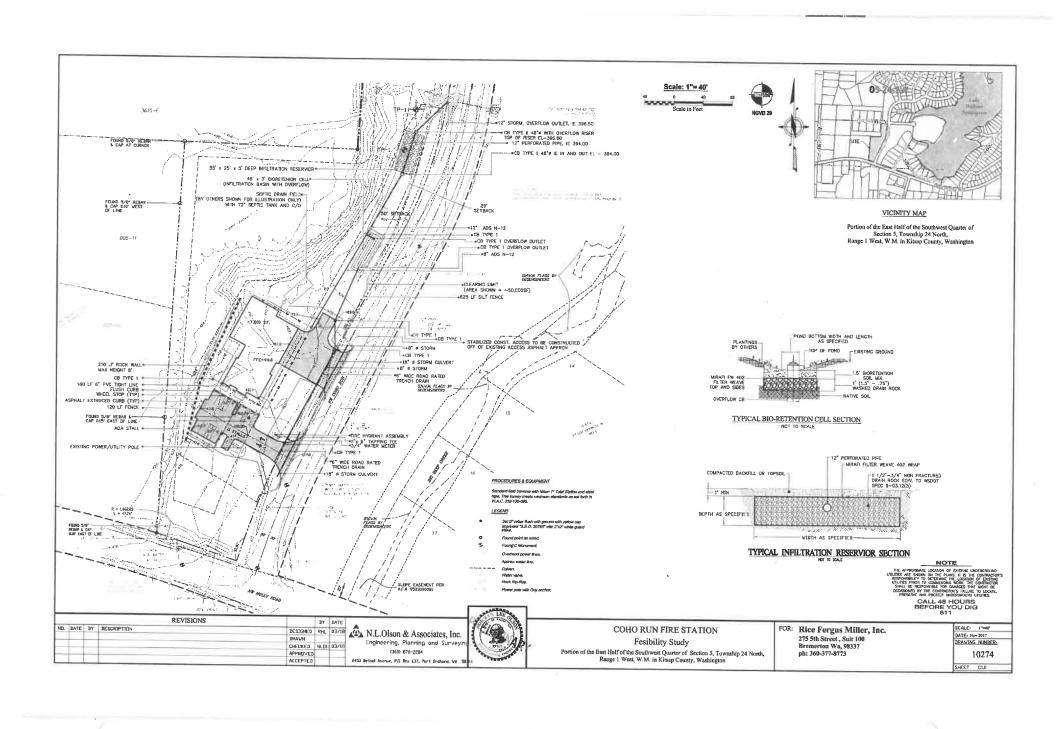


Station 57 Site Work Detail

Onsite area bounded construction limits: 60,820 SF Rates Current At September 2019

Descrip	ption		Unit	Qty	Rate	Total Cost
G3020	Sanitary Sewer					
152	Sanitary Sewer system allowance		LS	1	20,000.00	20,000
		Sanitary Sewer			\$0.33/SF	\$20,000
G3030	Storm Sewer					
154	Storm drainage systems		LS	1	75,000.00	75,000
		Storm Sewer			\$1.23/SF	\$75,000
G4010	Electrical Distribution					
169	Site electrical-lightiing,generator,comm,		LS	1	110,000.00	110,000
		Electrical Distribution			\$1.81/SF	\$110,000
Z1010	General Conditions					
178	General conditions		Mth	2	42,500.00	85,000
		General Conditions			\$1.40/SF	\$85,000
		ESTIMATED NET COST			\$13.65/SF	\$830,126

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REPORT
GEOTECHNICAL ENGINEERING SERVICES
PROPOSED CENTRAL KITSAP FIRE AND
RESCUE FACILITY
SEABECK, WASHINGTON

AUGUST 7, 2006

FOR RICE FERGUS MILLER ARCHITECTURE & PLANNING



Geotechnical Engineering Services File No. 7492-002-01

August 7, 2006

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REPORT

GEOTECHNICAL ENGINEERING SERVICES PROPOSED CENTRAL KITSAP FIRE AND RESCUE FACILITY SEABECK, WASHINGTON FOR

RICE FERGUS MILLER ARCHITECTURE & PLANNING

INTRODUCTION

This report presents the results of our geotechnical engineering services in support of the proposed development of a Central Kitsap Fire and Rescue facility located near Seabeck in Kitsap County, Washington. Our understanding of the project is based on our discussions with you, review of a project site study and plat drawings provided, and our experience in the project vicinity. The project site is approximately located as shown on the Vicinity Map, Figure 1, relevant site features are shown on the Site Plan, Figure 2.

PURPOSE AND SCOPE

The purpose of our services is to explore and evaluate shallow soil and groundwater conditions at the project site as a basis for the development of geotechnical recommendations and design criteria for the proposed improvements. As part of our services we observed soil conditions and conducted grain size analyses testing as a basis for providing a recommended long-term infiltration rate in general accordance with the 2005 Washington State Department of Ecology Stormwater Management Manual for Western Washington. Our specific scope of services includes the following:

- 1. Reviewing readily available published geologic information and geotechnical data in our files for information on subsurface conditions in the site vicinity.
- 2. Notifying the one-call utility locate service to check for underground utilities in accordance with Washington State requirements.
- 3. Observing excavation of 8 exploratory test pits to depths of 4 to 11 feet.
- 4. Conducting particle-size analyses on three soil samples obtained from test pits near the proposed infiltration system location. Samples were tested in general accordance with ASTM Test Method D 422. The results of the particle-size analyses were used in our evaluation of design infiltration criteria.
- Evaluating pertinent physical and engineering characteristics of site soils based on the results of the test pit explorations and geotechnical laboratory testing performed on selected bulk samples obtained.
- 6. Identifying slope-related landslide and erosion hazards at the site in general accordance with Kitsap County geologically hazardous areas criteria. We provide recommendations to address landslide and erosion hazards including buffers and setbacks from the top of steep slopes and erosion control measures as necessary and appropriate.
- 7. Providing recommendations for site preparation and earthwork including clearing and stripping, temporary and permanent cut and fill slopes and utility trench excavation and backfill considerations. We also discuss suitability of on-site soils for use as structural fill including constraints for wet weather construction, guideline specifications for imported soil for use as structural fill, and fill placement and compaction requirements.



- 8. Discussing seismic design considerations and providing seismic design criteria consistent with the current edition of the International Building Code (IBC). We also provide our opinion on liquefaction potential of site soils.
- 9. Providing recommendations for spread footing foundation design and slab-on-grade support of proposed structures including allowable soil bearing pressure, coefficient of base friction, lateral earth pressures and settlement (total and differential) estimates.
- 10. Providing recommendations for design of below grade cantilevered retaining walls including lateral soil pressures and coefficient of friction. We provide allowable soil bearing pressures as well as subgrade preparation recommendations.
- 11. Providing recommendations for permanent drainage including requirements for underslab drainage, retaining wall drainage, foundation drainage and site drainage, as necessary. We assume that storm drainage analysis and design will be accomplished by the project civil engineer.
- 12. Providing recommendations for asphalt concrete pavement (ACP) design, including base and subbase requirements for proposed driveway and parking areas. We provide typical minimum ACP section recommendations based on our experience.

GEOLOGY REVIEW

The geology of the Puget Sound region includes a thick sequence of consolidated glacial and unconsolidated non-glacial soils overlying bedrock. Glacial deposits were formed by ice sheets originating in the mountains of British Columbia. The most recent glacial advance was the Fraser Glaciation, which included the Vashon Stade, during which the Puget Lobe of the continental ice sheet advanced and retreated through the Puget Sound Basin. The Vashon Stade occurred approximately 14,000 years before the present time and is the source of the surficial glacial deposits in the project area. Landforms within the project area are primarily the result of glaciation, erosion, sedimentation, stream deposition and modification by road building activities.

Based on review of available published geologic maps, glacial soil deposits underlie the project site and surrounding area. The *Geologic Map of Kitsap County, Washington*, (Deeter, 1979) indicates the site and surrounding area is underlain by **Vashon recessional deposits (Qvrs)**. This material consists of unconsolidated medium to coarse grained sand deposited in recessional outwash channels. The *Slope Stability Map, Kitsap County, Washington* (Deeter, 1979) shows the site as being within an area mapped as Stable (S) with respect to slope stability.

Based on the U.S. Department of Agriculture (USDA) Soil Conservation Survey (SCS) of Kitsap County Area, Washington (1980) the soils in the area are mapped as primarily **Grove-very gravelly sandy loam**, **3 percent to 15 percent slopes**. These soils are described as somewhat excessively drained with slow runoff. The erosion hazard of these soils is described as slight. The western edge of the site is mapped as **Grove-very gravelly sandy loam**, **0 percent to 3 percent slopes**. Runoff is slow and erosion hazard is slight.

SITE CONDITIONS

PROJECT LOCATION

The site is located within T24N, R1W and Section 5 (Willamette Meridian) and is situated northwest of the intersection of Northwest Holly Road and Northwest Coho Run near Seabeck, Washington.

SURFACE CONDITIONS

The site is located in a predominantly undeveloped rural part of Kitsap County near Seabeck, Washington. The project site is irregular in shape with the longer dimension parallel to Northwest Coho Run. The site is bound to the south and east by NW Holly Road and NW Coho Run, respectively. Undeveloped property bounds the site to the north. The property to the west is developed.

Site topography generally slopes down from the west to the east. The north portion of the site slopes down to the east at an approximate inclination of 8 to 20 percent. There is a relatively flat area to the west-central portion of the site. At the east edge of this flat area the slope breaks and descends to the east at an approximate inclination of 40 percent. The height of this slope is on the order of 15 feet. The footprint of the proposed fire station building straddles the steep slope. The maximum slope observed is on the order of 65 percent with a height of 14 feet. The east and south portions of the site typically slopes gently down to the east at an inclination of less than 5 percent.

The majority of the site is free of vegetation. The exposed ground surface consists of gravel and sand. This includes the sloped areas discussed above. Thick vegetation consisting of Scotch Broom and coniferous trees is present on the flat area in the west-central portion of the site. Vegetation at the north end of the site consists of scotch broom and various shrubberies.

SUBSURFACE EXPLORATIONS

Our understanding of subsurface conditions at the project site is based on review of published geologic data and subsurface conditions disclosed in eight exploratory test pits completed within the proposed project area on June 27, 2006. Test pits were excavated at the approximate locations shown on Figure 2. At the time of exploration we did not have a site plan showing the proposed building and pond locations. In addition, existing utilities in the area of the proposed building limited exploration possibilities. Details of the exploratory program, laboratory testing program and the test pit logs are presented in Appendix A.

SUBSURFACE CONDITIONS

The soils encountered generally consist of medium dense to dense sand or gravel both with variable silt content. At several test pit locations the sand was observed to contain gravel and cobbles. Soils in Test Pit 7 consisted primarily of gravel with sand, and Test Pit 8 consists of sand with variable silt content to the depth explored.

Groundwater was not observed in any of the explorations. Based on our experience, seasonal perched groundwater seepage can occur in glacial deposits. Shallow or perched groundwater seepage typically occurs where relatively permeable soil layers or lenses are underlain by less permeable material. Groundwater conditions should be expected to vary as a result of season, precipitation and other factors.

GEOLOGIC HAZARD AREAS

We have based the following conclusions on our observations and our understanding of the Kitsap County Ordinance Regarding Growth Management, Title 19, Section 19.400.405, geologically hazardous areas. Kitsap County defines geologically hazardous areas as "...areas, that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to siting commercial, residential or industrial development consistent with public health or safety concerns." Kitsap County classifies geologically hazardous areas as areas of either high or moderate hazard according to the following definitions.

• Areas of High Geologic Hazard

- Areas with slopes greater than or equal to 30 percent and mapped by the the <u>Coastal</u> <u>Zone Atlas</u> or <u>Quaternary Geology and Stratigraphy of Kitsap County</u> as Unstable (U), Unstable Old Landslides (UOS) or Unstable Recent Slides (URS).
- Areas with slopes greater than or equal to 30 percent in grade and deemed by a qualified geologist or geotechnical engineer to meet the criteria of U, UOS, or URS.

• Areas of Moderate Geologic Hazard

- o Areas designated U, UOS, or URS in the <u>Coastal Zone Atlas</u> or <u>Quaternary Geology and Stratigraphy of Kitsap County</u>, with slopes less than 30 percent; or areas found by a qualified geologist to meet the criteria for U, UOS, or URS with slopes less than 30 percent; or
- O Slopes identified as Intermediate (I) in the <u>Coastal Zone Atlas</u> or <u>Quaternary Geology</u> and <u>Stratigraphy of Kitsap County</u>, or areas found by a qualified geologist to meet the criteria of I; or
- o Slopes 15 percent or greater, not classified as I, U, UOS, or URS, with soils classified by the U.S. Department of Agriculture Natural Resources Conservation Service as "highly erodible" or "potentially erodible"; or
- o Slopes of 15 percent or greater with springs or groundwater seepage not identified in the above subsections.

Our field staff investigated the site on June 27, 2006 by performing a geologic reconnaissance and observing test pit explorations. The existing slopes near the center of the site appear to be man-made, possibly from prior quarry operations. While on site we did not observe seepage or indications of slope instability that would lead us to classify the existing slopes as I, U, UOS, or URS. Based on our site investigations, review of available literature, and the relatively low height of the slopes, it is our opinion that the existing slopes do not meet the criteria for either a High or Moderate geologic hazard. However, it is our recommendation that if construction is to occur on the steep slope that the slope be treated as a permanent slope and that it should be regraded as necessary to meet the recommendations provided in the "Permanent Cut and Fill Slopes" section of this report. If the steep slope is left in this current condition we recommend a building setback of 15 feet from the top and toe of slope.

RECOMMENDATIONS

GENERAL

Based on the results of our review and subsurface exploration program, it is our opinion that the site is generally suitable for the proposed development with regard to geotechnical considerations. A summary of the primary geotechnical considerations is provided below. The summary is presented for introductory purposes only and should be used in conjunction with the complete recommendations presented in this report.

- Site soil conditions are generally suitable for stormwater infiltration.
- Where present, surficial duff, sod and organic-rich soil should be stripped from all areas to be improved.
- The existing site soil may be considered for use as structural fill.
- Glacial deposits can contain cobbles and boulders. The contractor should be prepared for this
 possibility.
- The proposed structures can be supported on continuous and isolated shallow foundations supported on native soil or on structural fill that extends to the native soil.
- Floor slabs may be supported on native soil or structural fill that extends to the native soil.
- Foundation drains are not required for shallow perimeter footings, but should be included for subsurface wall footings.

SITE DEVELOPMENT AND EARTHWORK

General

We anticipate that site development work will include removing trees, clearing and stripping, placing fill to establish design grades, excavating for utility trenches, and placing and compacting excavated or backfill materials. We expect that the majority of site grading can be accomplished with conventional earthmoving equipment. The following sections provide recommendations for earthwork, site development and fill materials.

Stripping and Clearing

The existing trees, brush, sod and organic-rich soil should be stripped and removed from proposed pavement and structural areas. Stripped material should be transported off site for disposal or processed and used in landscaping areas. The primary root systems for trees and shrubs should be completely removed.

Required stripping depths should be evaluated based on observations during the stripping operation. We estimate stripping depths should be less than 6 inches to remove the surficial organic material. Greater stripping depths may be required to remove localized zones of loose or organic soil and tree roots. It is common during excavation to encounter perched groundwater seepage at shallow depth within the glacial deposits. The extent of the seepage and depth at which it might be encountered often depends on the time of year of construction. Groundwater seepage can soften soil and could create construction difficulties. Additional stripping may be required if subgrades become disturbed during stripping operations.

Subgrade Preparation

We recommend that site preparation include compacting the exposed soil to a uniformly firm and unyielding condition. We recommend that prepared subgrades be observed by a member of our firm, prior to placement of fill or structures. Our representative will evaluate the suitability of the subgrade and identify areas of yielding, which are indicative of soft or loose soil. The exposed subgrade soil should be proof-rolled with heavy rubber-tired equipment and/or probed with a 1/2-inch-steel rod, as necessary. If soft or otherwise unsuitable areas are revealed during proof-rolling or probing that cannot be compacted to a stable and uniformly firm condition, we recommend that: 1) the subgrade soils be scarified (e.g., with a ripper or farmer's disc), aerated and recompacted; or 2) the unsuitable soils be removed and replaced with structural fill, as needed.

Some of the soils encountered in the explorations contain a significant percentage of fines. This material may be sensitive to small changes in moisture content. Site soil may be difficult, if not impossible, to work and compact during wet weather conditions. Soil with high fines content (sand with silt or gravel with silt) is susceptible to disturbance from construction traffic when wet or if earthwork is performed during wet weather.

If grading takes place during periods of wet weather, protective surfacing such as placing asphalt-treated base (ATB) or haul roads made of quarry spalls or a layer of free-draining material such as well graded pit-run sand and gravel may be necessary to protect completed areas. Typically, minimum gravel thicknesses on the order of 24 inches are necessary to provide adequate subgrade protection. Additionally, completed areas should be restricted from traffic during wet weather conditions. During periods of wet weather, concrete should be placed as soon as practical after preparation of the footing excavations. Subgrade protection for foundations consisting of a lean concrete mat may be necessary if footing excavations are exposed to wet weather conditions.

Boulders are occasionally present in glacial deposits and could be encountered during grading and/or in other excavations. Accordingly, the contractor should be prepared to remove boulders, if encountered. Boulders may be removed from the site or buried in landscape areas. Voids caused by boulder removal should be backfilled with structural fill.

Temporary Excavation Support

Excavations deeper than 4 feet should be shored or laid back at a stable slope if workers are required to enter. Shoring and temporary slope inclinations must conform to the provisions of Title 296 Washington Administrative Code (WAC), Part N, "Excavation, Trenching and Shoring." Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls will be required under Washington Industrial Safety and Health Act (WISHA) if the excavation is deeper than 4 feet. The contract documents should specify that the contractor is responsible for selecting excavation and dewatering methods, monitoring the excavations for safety and providing shoring, as required, to protect personnel and structures.

In general, temporary cut slopes should be inclined no steeper than about 1-1/2H:1V (horizontal to vertical). This guideline assumes that all surface loads are kept at a minimum distance of at least one half the depth of the cut away from the top of the slope and that significant seepage is not present on the slope face. Flatter cut slopes will be necessary where significant seepage occurs or if large voids are created during excavation. Some sloughing and raveling of the cut slopes should be expected. Temporary covering with heavy plastic sheeting should be used to protect these slopes during periods of wet weather.

Permanent Cut and Fill Slopes

We recommend permanent cut and fill slopes be constructed at a maximum inclination of 2H:1V. We recommend that permanent slopes in the proposed stormwater pond be constructed at a maximum inclination of 3H:1V. Where the above permanent slopes are not feasible, protective facings and/or retaining structures should be considered. Cut areas should be re-vegetated as soon as practical to reduce the surface erosion and sloughing. Temporary protection should be used until permanent protection is established. To achieve uniform compaction, we recommend that fill slopes be overbuilt slightly and subsequently cut back to expose well compacted fill.

FILL MATERIALS

General

Material used for fill should be free of debris, organic contaminants and rock fragments larger than 6 inches. The workability of material for use as structural fill will depend on the gradation and moisture content of the soil. As the amount of fines (silt and clay-sized particles passing the U.S. Standard No. 200 sieve) increases, soil becomes increasingly more sensitive to small changes in moisture content. We recommend that select granular fill or crushed rock be used for structural fill during the rainy season. The following paragraphs summarize the material requirements for fill and backfill.

Select Granular Fill

If construction is performed during wet weather conditions, we recommend using fill consisting of well-graded sand and gravel or crushed rock with a maximum particle size of 6 inches and less than 5 percent fines by weight based on the minus 3/4-inch fraction. Organic matter, debris or other deleterious material should not be present. In our opinion, material conforming to Washington State Department of Transportation (WSDOT) Specifications 9-03.9 (Aggregates for Ballast and Crushed Surfacing), 9-03.10 (Aggregate for Gravel Base), and 9-03.14 (Borrow) are suitable for use as import fill material during wet weather with the exception that the fines content should be 5 percent or less. In addition, some larger particle sizes are acceptable, as described above. If prolonged dry weather prevails during the earthwork phase of construction, a somewhat higher fines content may be acceptable, but not for select granular fill used for roadway subbase.

Pipe Bedding

Trench backfill for the bedding and pipe zone should consist of well-graded granular material with a maximum particle size of 3/4 inch and less than 5 percent passing the U.S. Standard No. 200 sieve. The material should be free of roots, debris, organic matter and other deleterious material.

Crushed Rock

Crushed rock fill should consist of clean, durable, crushed angular rock that has a maximum particle size of 4 inches, is well graded between coarse and fine sizes and has less than 5 percent fines (material finer than a U.S. Standard No. 200 sieve). A smaller maximum particle size will be required for some applications as discussed in other sections of this report. Gravel materials should be crushed to have at least two fractured faces. Organic matter, debris or other deleterious material should not be present.

Use of On-Site Soil as Fill

Surficial organic-rich soil and sod are not suitable for structural fill and should be removed from areas to be improved or used in landscaping areas. Existing granular soils may be considered for use as structural fill provided they meet the following criteria. On-site materials used as structural fill should be free of roots, organic matter and other deleterious materials and particles larger than 6 inches in diameter. During extended periods of dry weather construction, non-organic on-site soil may be considered for use as fill provided it meets the criteria of its intended use and can be compacted as recommended. If the excavated material is over optimum moisture content or becomes wet, it will be necessary to aerate or dry the soil prior to placement and compaction.

Some of the soils encountered contain significant amounts of fines and will be moisture sensitive. Compaction of these soils will be difficult, if not impossible, to achieve during wet weather conditions. Even when properly compacted, this material can be easily disturbed and will soften when exposed to moisture.

FILL PLACEMENT AND COMPACTION

General

Fill soils should be compacted at a moisture content near optimum. The maximum allowable moisture content varies with the soil gradation and should be evaluated during construction. Fill and backfill material should be placed in uniform, horizontal lifts, and uniformly densified with vibratory compaction equipment. The maximum lift thickness will vary depending on the material and the compaction equipment used, but generally should not exceed 10 inches in loose thickness.

Area Fills and Bases

Fill placed to raise site grades and materials under pavements should be placed on a prepared subgrade that consists of densely compacted inorganic native soils or compacted fill. In general, we recommend fill be compacted to at least 95 percent of the maximum dry density (MDD) determined by American Society for Testing and Materials (ASTM) Test Method D 1557 (modified Proctor), except in utility trenches as discussed below.

Trench Backfill

For utility excavations, we recommend that the initial lift of fill over the pipe be thick enough to reduce the potential for damage during compaction but generally should not be greater than about 18 inches. In addition, rock fragments greater than about 1 inch in maximum dimension should be excluded from this lift.

In paved and structural areas, trench backfill should be uniformly compacted in horizontal lifts to at least 95 percent of the MDD in the upper 2 feet below subgrade. Fill placed below a depth of 2 feet from subgrade should be compacted to at least 90 percent of the MDD. In nonstructural areas, trench backfill should be compacted to a firm condition that will support construction equipment, as necessary.

FOUNDATION SUPPORT

General

We recommend that the new Central Kitsap Fire and Rescue Facility building be supported on conventional spread footings bearing on native soil or compacted structural fill that extends to native soil. If soft or disturbed soil is present on the bearing surface, we recommend it be recompacted or overexcavated to firm bearing and replaced with compacted structural fill. The zone of compacted structural fill should extend laterally beyond the footing edges a horizontal distance at least equal to the overexcavation depth.

Spread Footings

We recommend that exterior footings be founded at least 18 inches below lowest adjacent finished grade. Interior footings should be founded a minimum of 12 inches below top of slab. Continuous wall footings and individual column footings should have minimum widths of 16 inches and 24 inches, respectively. The recommended allowable soil bearing pressure for footings supported as recommended herein is 3,000 pounds per square foot (psf) for continuous wall footings and isolated column footings. The allowable soil bearing pressure is for the total of dead plus long-term live loads and may be increased by up to one-third when considering total loads, including short-term live loads such as those induced by wind or seismic forces.

Lateral Resistance

Lateral loads on building footings can be resisted by passive resistance on the sides of the footings and by friction on the base of the footings and slab. Passive resistance should be evaluated using an equivalent fluid density of 300 pounds per cubic foot (pcf) provided footings are backfilled with structural fill compacted to 95 percent of MDD. Passive pressure resistance should be calculated from the bottom of adjacent floor slabs or paving or below a depth of 1 foot where the adjacent area is unpaved, as appropriate. Frictional resistance between foundation concrete and supporting soil can be evaluated using 0.4 for the coefficient of base friction, applied to foundation dead loads. The passive and frictional resistance values incorporate a factor of safety of about 1.5.

Settlement

Based on typical low-rise construction loads we estimate that settlement for continuous and isolated footings, designed and constructed as recommended herein, should be less than 1 inch for the anticipated loading conditions. Differential settlements between comparably loaded isolated column footings or along 50 feet of continuous footing should be less than 1/2 inch. Settlement is expected to occur as loads are applied.

FLOOR SLABS

A modulus of subgrade reaction of 300 pounds per cubic inch (pci) may be used for designing the building on-grade floor slabs provided that the subgrade consists of proof-compacted, firm and unyielding native soil or structural fill and has been prepared in accordance with our recommendations. We estimate that differential settlement of the floor slabs will be 1/2 inch or less over a span of 50 feet provided that the fill below the slab is compacted as specified.

We recommend that on-grade slabs be underlain by a minimum 4-inch-thick capillary break layer to reduce the potential for moisture migration into the slab. The capillary break material should consist of a well-graded sand and gravel or crushed rock with a maximum particle size of 3/4 inch and have less than 5 percent passing the U.S. No. 200 sieve. The material should be placed as recommended in the "Fill Placement and Compaction" section.

Vapor barriers are often required by flooring manufacturers to protect flooring and adhesives. Many flooring manufacturers will warrant their products only if a vapor barrier is installed according to their recommendations. We recommend that a vapor barrier be installed where dry slabs are required.

CONVENTIONAL RETAINING WALLS

Drainage

Positive drainage is imperative behind any retaining structure. This can be accomplished by using a drainage zone of free-draining material behind the wall with perforated pipes to collect water. The drainage material should consist of coarse sand and gravel containing less than 3 percent passing the U.S. No. 200 sieve based on the fraction of material passing the 3/4-inch sieve. The wall drainage zone should extend horizontally at least 18 inches from the back of the wall.

A perforated smooth-walled rigid PVC pipe having a minimum diameter of 4 inches should be placed at the bottom of the drainage zone along the entire length of the wall, with the pipe invert at or below the elevation of the base of the wall footing. The drainpipes should discharge to a tightline leading to an appropriate collection and disposal system. An adequate number of cleanouts should be incorporated into the design of the drains in order to provide access for regular maintenance.

Design Parameters

Footings for retaining walls should be designed in accordance with the "Foundation Support" recommendations above. Retaining structures that are free to rotate slightly around the base (cantilever) should be designed for active earth pressures using an equivalent fluid unit weight of 35 pcf. If retaining walls are restrained against rotation during backfilling, they should be designed for an at-rest equivalent fluid unit weight of 50 pcf. These values are based on a level backfill condition. For a sloping backfill condition not exceeding 2H:1V we recommend an equivalent fluid weight of 55 PCF for design.

Surcharge loads applied closer than one-half of the wall height should be considered as uniformly distributed horizontal pressures equal to one-third of the distributed vertical surcharge pressure. A uniform seismic pressure of 6H psf, where H is the height of the wall, should be included when designing permanent below grade walls for seismic loads.

GROUNDWATER HANDLING

Based on our experience with glacial landforms in the Puget Sound region, we anticipate that groundwater elevations and quantities will vary with location and time. Groundwater conditions at the site can vary due to seasonal fluctuations or other factors not evident during our subsurface explorations. We anticipate that groundwater handling needs will generally be lower during the late summer and early fall months.

Local zones of perched groundwater can occur where more permeable soil is underlain by less permeable silt and clay-sized soil units. We recommend the contractor control groundwater during construction as necessary.

SEISMIC DESIGN CONSIDERATIONS

General

The site is located within the Puget Sound region, which is seismically active. Seismicity in this region is attributed primarily to the interaction between the Pacific, Juan de Fuca and North American plates. The Juan de Fuca plate is subducting beneath the North American plate. It is thought that the resulting deformation and breakup of the Juan de Fuca plate might account for the deep focus earthquakes in the region. Hundreds of earthquakes have been recorded in the Puget Sound area. In recent history, four of these earthquakes were large events: 1) in 1946, a Richter magnitude 7.2 earthquake occurred in the Vancouver Island, British Columbia area; 2) in 1949, a Richter magnitude 7.1 earthquake occurred in the Olympia area; 3) in 1965, a Richter magnitude 6.5 earthquake occurred between Seattle and Tacoma; and 4) in 2001 a Richter magnitude 6.8 earthquake occurred in Nisqually, near Olympia, Washington.

Research is presently underway regarding historical large magnitude subduction-related earthquake activity along the Washington and Oregon coasts. Geologists are reporting evidence that suggests several large magnitude earthquakes (Richter magnitude 8 to 9) have occurred in the last 1,500 years, the most recent of which occurred about 300 years ago. No earthquakes of this magnitude have been documented during the recorded history of the Pacific Northwest.

Seismic Design Criteria

Seismic design for the building area may be performed using the equivalent static force procedure outlined in the 2003 IBC using the parameters provided below.

2003 IBC

Spectral Response Accel. at Short Periods (S_S) = 1.40

Spectral Response Accel. at 1 Second Periods (S₁) = 0.45

Site Class = C

Site Coefficient (F_A) = 1.0

Site Coefficient (F_V) = 1.35

Table 1. Seismic Design Parameters

Liquefaction Potential

Liquefaction refers to a condition where vibration or shaking of the ground, usually from earthquake forces, results in development of excess pore pressures in saturated soils and subsequent loss of strength in the deposit of soil so affected. In general, soils that are susceptible to liquefaction include loose to medium dense "clean" to silty sands that are below the water table. In our opinion, the potential for liquefaction at this site is low.

DRAINAGE AND EROSION CONSIDERATIONS

General

Control of surface water during and after construction will reduce the potential for erosion on the site. The loose to medium dense sand could be susceptible to erosion during and immediately following construction. The following sections provide recommendations to reduce the potential for erosion during and after construction.

Erosion Control

Effective erosion and sedimentation controls should be implemented during construction so that impacts to adjacent properties are reduced. In our opinion, the potential erosion hazard at the site is low.

During construction, surface water should be directed away from the building pad and structures using constructed berms and/or swales. The contractor should be responsible for constructing and maintaining a temporary surface water collection system to direct surface water away from the structures. We recommend that final grades be sloped away from structures and foundations to promote drainage.

After construction, surface water from roofs, driveways and landscape areas should be collected and controlled. Curbs or other appropriate measures such as sloping pavements, sidewalks and landscape areas should be used to direct surface flow away from the buildings, erosion sensitive areas and from behind retaining structures. Roof and catchment drains should not discharge into wall or foundation drains.

PAVEMENT RECOMMENDATIONS

General

We understand new pavement areas will be constructed throughout the site. Our recommended typical pavement sections based on our experience are presented below. These pavement sections may not be adequate for heavy construction traffic conditions such as imposed by concrete transit mixers, dump trucks or crane loads. Additional pavement thickness may be necessary to prevent pavement damage during construction, and/or repair of damaged pavements should be anticipated.

Asphaltic Concrete Pavement

Pavement subgrades and fill should be prepared and placed as previously described. The crushed rock base course should be moisture conditioned near the optimum moisture content and compacted to at least 95 percent of the MDD determined in accordance with ASTM D 1577 test procedures. An appropriate number of in-place density testing should be conducted on the compacted base course to check that adequate compaction has been obtained. Crushed rock base course should conform to applicable sections of 4-04 and 9-03.9(3) of the 2006 WSDOT Standards. Class A or B asphaltic concrete should conform to applicable sections of 5-04, 9-02 and 9-03 of the WSDOT Standards. The recommended pavement sections assume that final improvements surrounding the pavement will be designed and constructed such that stormwater or excess irrigation water from landscape areas does not infiltrate below the pavement section into the crushed base or subbase fill.

Standard-Duty Asphaltic Concrete Pavement (Automobile Parking Areas)

• 2 inches of Class A or B asphaltic concrete.

- 4 inches of crushed surfacing base course and/or top course compacted as recommended.
- Native subgrade and/or structural fill prepared and placed as previously recommended.

Heavy-Duty Asphaltic Concrete Pavement (Access Roadways)

- 3 inches of Class A or B asphaltic concrete.
- 6 inches of crushed surfacing base course and/or top course compacted as recommended.
- Native subgrade and/or structural fill prepared and placed as previously recommended.

STORMWATER INFILTRATION

Select soil samples obtained from Test Pits 1 and 8 were tested in general accordance with ASTM D 422 to determine the grain size distribution. The results of the grain size distribution testing are presented in Appendix A, Figure A-10. We compared these results with empirical correlations to infiltration rates presented in the 2005 Washington State Department of Ecology Stormwater Management Manual for Western Washington. Design stormwater infiltration rates for the soil samples obtained are provided in the table below.

Table 2. Soil Infiltration Rates Grain-Size Distribution Analysis¹

Test Pit No.	Soil Sample No.	Soil Sample Depth (feet)	Approximate Elevation ³ of Sample (feet)	USCS Soil Classification	USDA Soil Classification	Recommended Infiltration Rate ² (inches per hour)
1	2	9	406	GP	SAND	10
8	2	3.5	396.5	SP-SM	SAND	10
8	4	10	390	SP	SAND	10

Notes:

³ Based on Topographic Survey provided by Rice, Fergus, Miller Architecture and Planning, Inc.

The values presented above are for the samples obtained in a particular area at a particular elevation and represent an estimate of design infiltration rates. Location specific field or laboratory infiltration testing in accordance with local regulations should be performed to develop final design infiltration values. Stormwater should be treated in accordance with current regulations prior to infiltration.

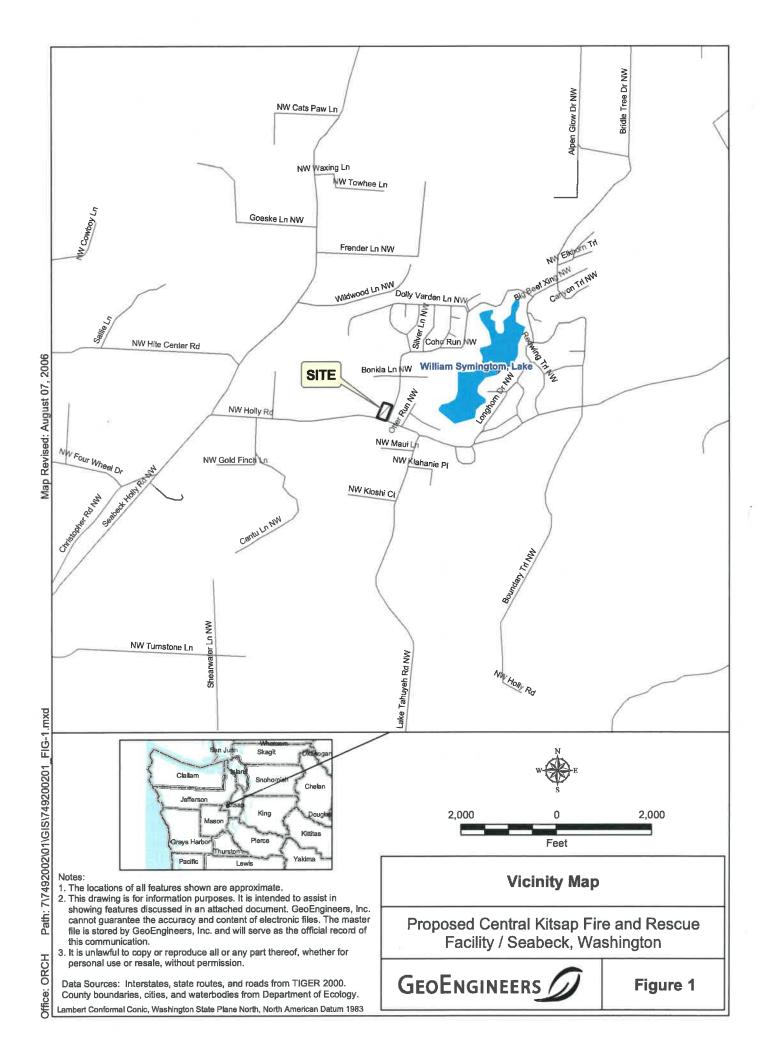
LIMITATIONS

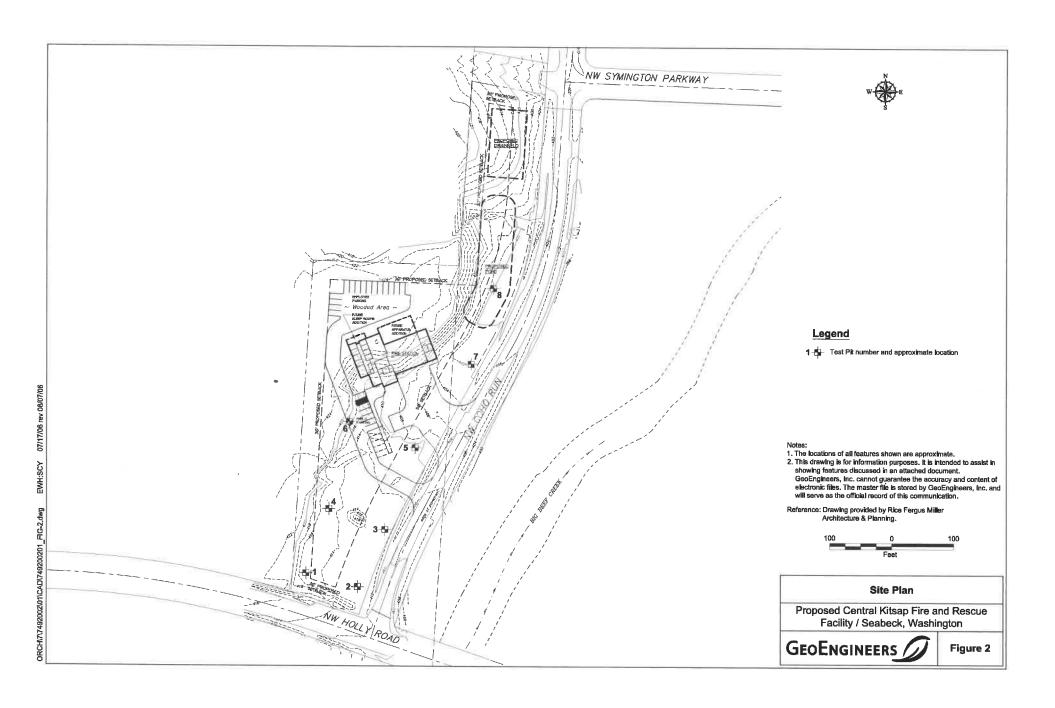
We have prepared this report for the exclusive use by Rice, Fergus Miller Architecture and Planning and their authorized agents for the Central Kitsap Fire and Rescue Facility project located at the intersection of NW Holly Road and NW Coho Run near Seabeck, Washington. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Please refer to the Appendix B titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

¹ For selected soil samples.

² Based on grain-size analysis in accordance with procedures outlined for ASTM D 422 and the 2005 Washington State Department of Ecology Stormwater Management Manual for Western Washington, Table 3.7.







APPENDIX A SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

APPENDIX A SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

SUBSURFACE EXPLORATIONS

We explored subsurface conditions at the site on June 27, 2006. The explorations were located in the field by our representative by pacing from existing site features such as roadways and topographic features. The approximate locations of the explorations are indicated on the Site Plan, Figure 2. The locations noted on Figure 2 should be considered approximate. Ground surface elevations at the exploration locations were estimated by interpolating between topographic contours shown on Figure 2.

Our representative continuously monitored the explorations, maintained logs of the subsurface conditions, and obtained representative samples of each soil encountered. The soils encountered were visually classified in general accordance with the system described in Figure A-1, American Society for Testing and Materials (ASTM) D 2488.

Test pits were excavated to depths between 4 and 11 feet below ground surface (bgs) using a rubber-tired backhoe. The backhoe and operator were provided by Green Earthworks Construction under subcontract to GeoEngineers, Inc. The excavations were continuously monitored by our representative who maintained a detailed log of subsurface conditions, visually classified the soils encountered and obtained representative samples from the test pits. The densities noted on the logs are based on the difficulty of excavation and our experience and judgement. A key to the symbols used on the test pit logs is included as Figure A-1. Summary test pit logs are presented as Figures A-2 through A-9. Following excavation, test pits were backfilled with the excavator bucket, tamping the soil approximately every 2 feet.

LABORATORY TESTING

General

Soil samples obtained from the test pits were transported to GeoEngineers laboratory. Representative soil samples were selected for laboratory tests to evaluate the pertinent geotechnical engineering characteristics of the site soils and to confirm our field classification. The following paragraphs provide a description of the tests performed.

Moisture Content

The moisture content of selected samples was determined in general accordance with ASTM Test Method D 2216. The test results are used to aid in soil classification and correlation with other pertinent engineering soil properties. The test results are presented on the test pit logs.

Particle-Size Analysis

Particle-size analyses were performed on selected samples in general accordance with ASTM Test Method D 422. This test method covers the quantitative determination of the distribution of particle sizes in soils. Typically, the distribution of particle sizes larger than 75 micrometers (μ m) is determined by sieving. The results of the tests were used to verify field soil classifications. Figure A-10 presents the test results.

SOIL CLASSIFICATION CHART

B.0	AJOR DIVISIO	ONE	SYMI	BOLS	TYPICAL	
IVI	AJUK DIVISI	ONO	GRAPH	LETTER	DESCRIPTIONS	
	GRAVEL	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
	AND GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
COARSE GRAINED SOILS	MORE THAN 50% OF COARSE FRACTION	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL • SAND • SILT MIXTURES	
COILD	RETAINED ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES	
MORE THAN 50%	SAND	CLEAN SANDS		sw	WELL-GRADED SANDS, GRAVELLY SANDS	
RETAINED ON NO. 200 SIEVE	AND SANDY SOILS	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND	
	MORE THAN 50% OF COARSE FRACTION	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES	
	PASSING NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		sc	CLAYEY SANDS, SAND - CLAY MIXTURES	
				ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY	
FINE GRAINED	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
SOILS			m	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
MORE THAN 50% PASSING NO. 200 SIEVE				МН	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS	
	SILTS LIQUID LIMIT AND GREATER THAN 50 CLAYS		7//	СН	INORGANIC CLAYS OF HIGH PLASTICITY	
			July	ОН	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY	
н	GHLY ORGANIC S	SOILS		PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

ADDITIONAL MATERIAL SYMBOLS

SYMI	BOLS	TYPICAL	
GRAPH	LETTER	DESCRIPTIONS	
	СС	Cement Concrete	
	AC	Asphalt Concrete	
	CR	Crushed Rock/ Quarry Spalls	
	TS	Topsoil/ Forest Duff/Sod	

 $\overline{\sum}$

Measured groundwater level in exploration, well, or piezometer



Groundwater observed at time of exploration



Perched water observed at time of exploration



Measured free product in well or piezometer

Stratigraphic Contact

Distinct contact between soil strata or geologic units



Gradual change between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig. $\,$

Laboratory / Field Tests

Percent fines ÁL CA CP Atterberg limits Chemical analysis Laboratory compaction test CS Consolidation test DS Direct shear HA Hydrometer analysis Moisture content MD Moisture content and dry density OC **Organic content** PM Permeability or hydraulic conductivity PP Pocket penetrometer SA Sieve analysis ΤX Triaxial compression UC **Unconfined compression** Vane shear

Sheen Classification

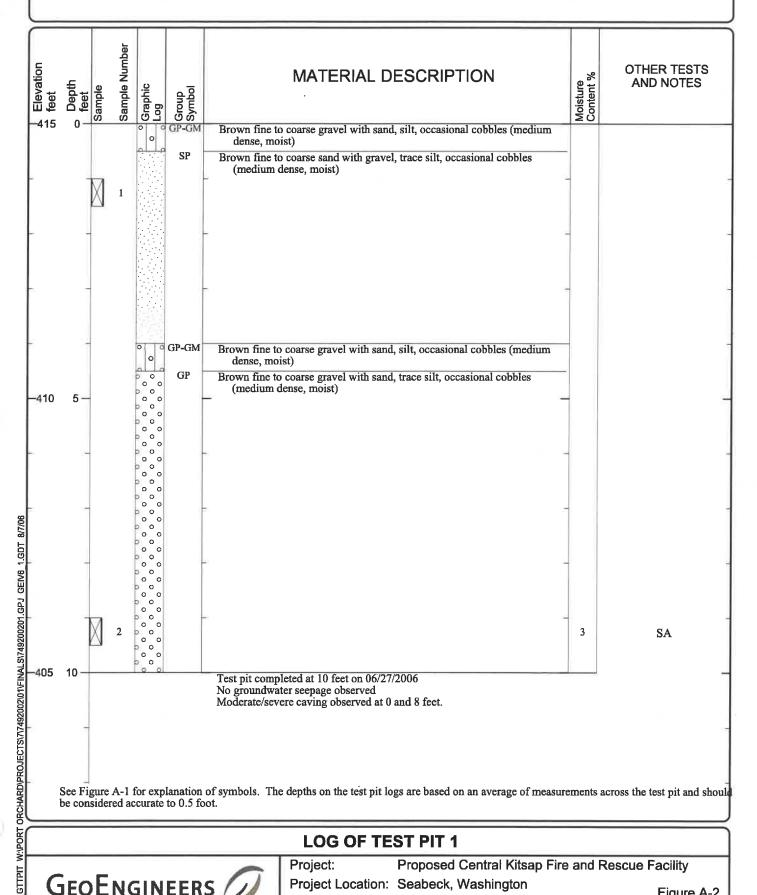
NS No Visible Sheen SS Slight Sheen MS Moderate Sheen HS Heavy Sheen NT Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS



06/27/2006 **GRL** Date Excavated: Logged by: __ Hitachi Ex 60 415 Equipment:_ Surface Elevation (ft):



LOG OF TEST PIT 1



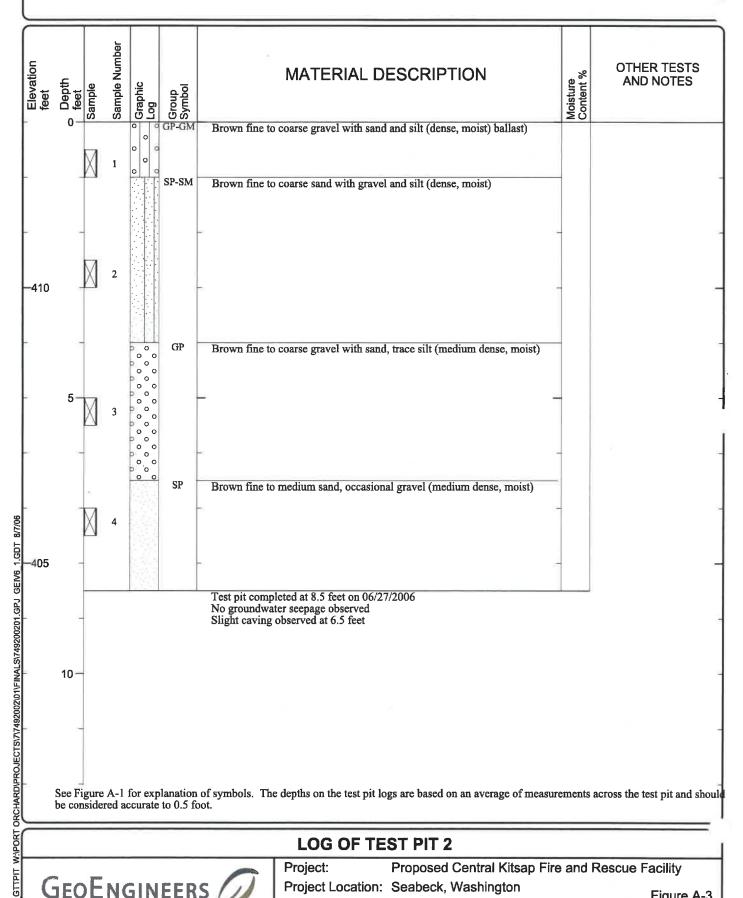
Project: Proposed Central Kitsap Fire and Rescue Facility

Project Location: Seabeck, Washington

Project Number: 7492-002-01

Figure A-2 Sheet 1 of 1

06/27/2006 **GRL** Date Excavated: Logged by: ____ Hitachi Ex 60 413 Equipment: Surface Elevation (ft):



LOG OF TEST PIT 2



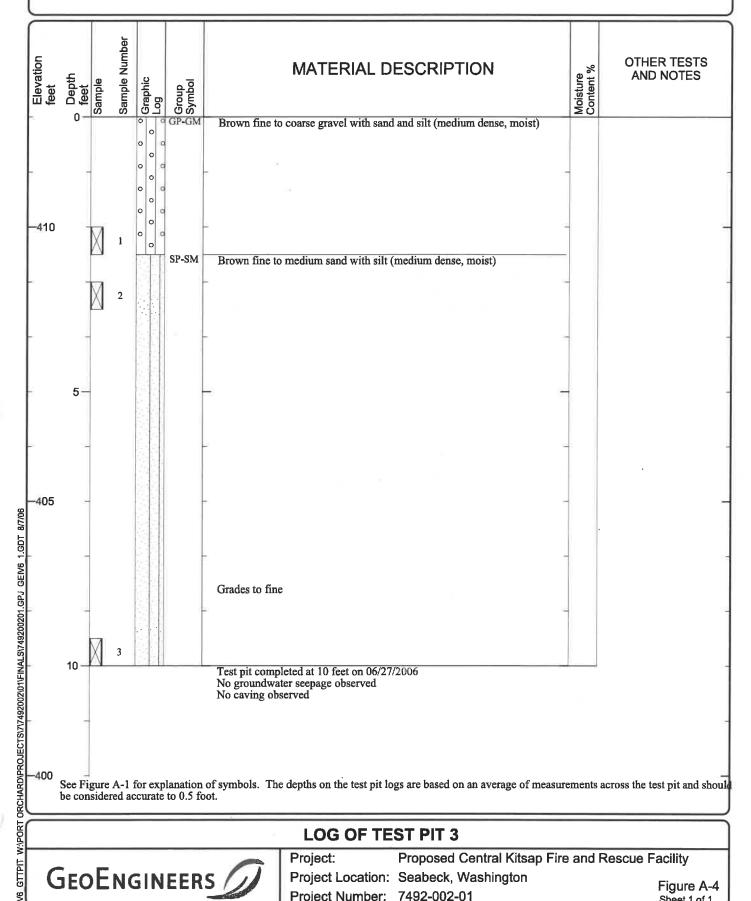
Proposed Central Kitsap Fire and Rescue Facility Project:

Project Location: Seabeck, Washington

Project Number: 7492-002-01

Figure A-3 Sheet 1 of 1

Date Excavated: _	06/27/2006	Logged by:	GRL
Equipment:	Hitachi Ex 60	Surface Elevation (ft):_	412



LOG OF TEST PIT 3



Project: Proposed Central Kitsap Fire and Rescue Facility

Project Location: Seabeck, Washington

Project Number: 7492-002-01

Figure A-4 Sheet 1 of 1

	Date Excavated: 06/27/2006 Equipment: Hitachi Ex 60				Logged by:		415				
Elevation	Depth feet	sample	Sample Number	Graphic Log	Symbol Symbol		МАТ	ERIAL DESCR	IPTION	Moisture Content %	OTHER TESTS AND NOTES

Brown fine to coarse sand, trace silt, organics, occasional gravel (medium dense, moist) GP Brown fine to coarse gravel with sand, trace silt (medium dense, moist) 410 Test pit completed at 6 feet on 06/27/2006 No groundwater seepage observed Severe caving observed at 3 feet GTTPIT W:/PORT ORCHARD/PROJECTS/77492002/01/FINALS/749200201.GPJ GEIN6_1.GDT 8/7/06 405 10-

See Figure A-1 for explanation of symbols. The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF TEST PIT 4

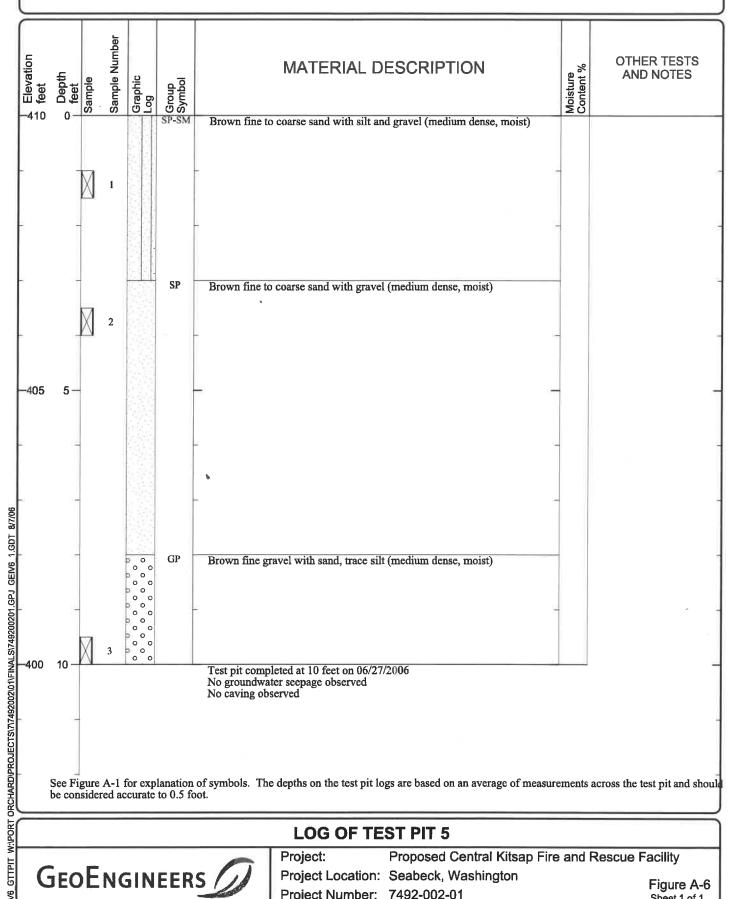
Proposed Central Kitsap Fire and Rescue Facility Project:

Project Location: Seabeck, Washington

Project Number: 7492-002-01

Figure A-5 Sheet 1 of 1

Date Excavated:	06/27/2006	Logged by:	GRL
Equipment:	Hitachi Ex 60	Surface Elevation (ft):_	410



LOG OF TEST PIT 5



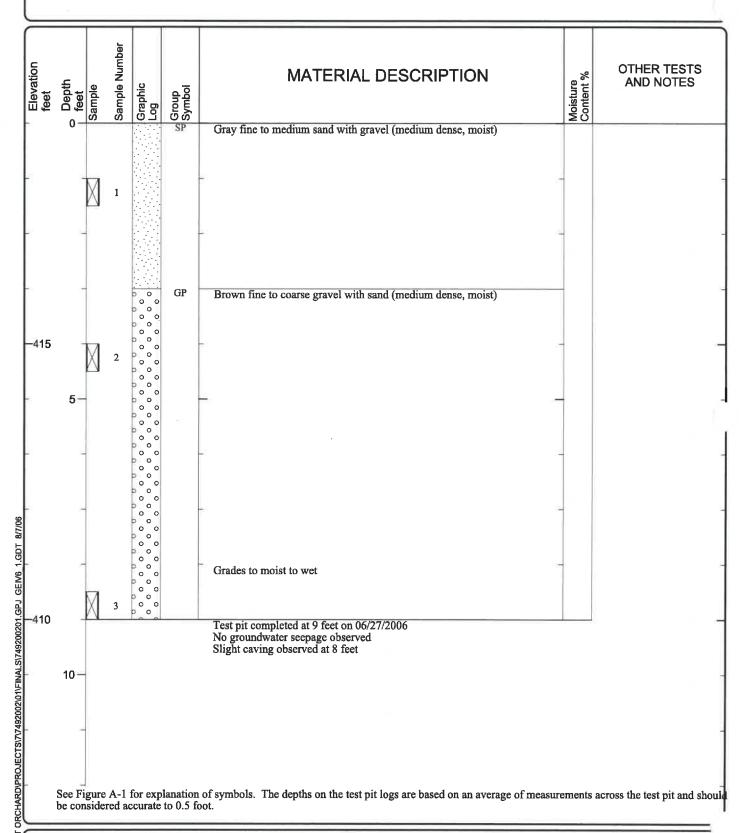
Project: Proposed Central Kitsap Fire and Rescue Facility

Project Location: Seabeck, Washington

Project Number: 7492-002-01

Figure A-6 Sheet 1 of 1

Date Excavated:	06/27/2006	Logged by:	GRL
Equipment:	Hitachi Ex 60	Surface Elevation (ft):	419



GEOENGINEERS Project: Project Location

roject: Proposed Central Kitsap Fire and Rescue Facility

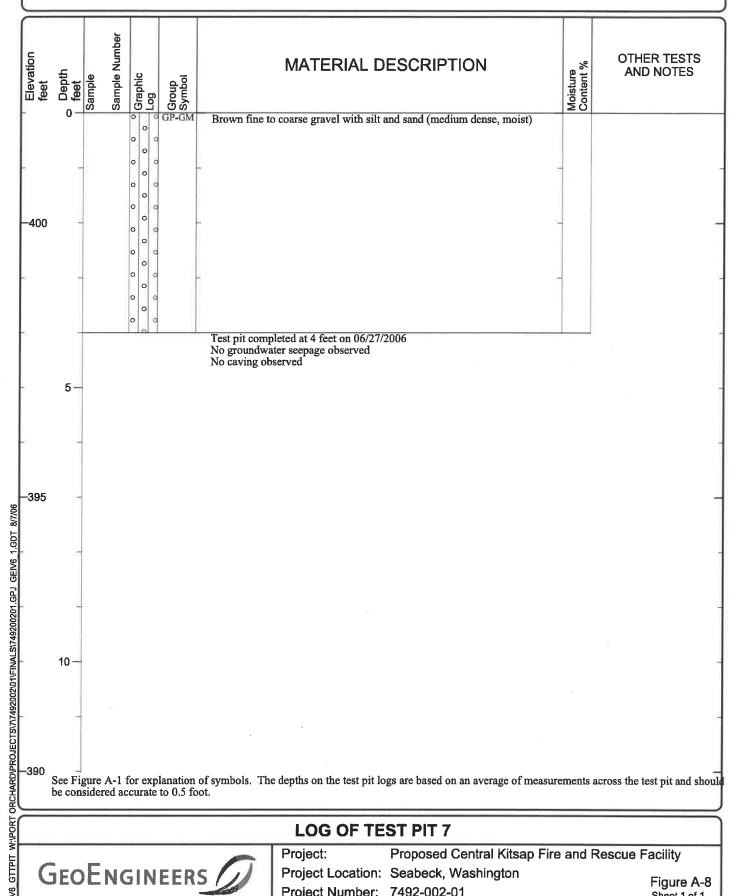
Project Location: Seabeck, Washington

LOG OF TEST PIT 6

Project Number: 7492-002-01

Figure A-7 Sheet 1 of 1

Date Excavated:	06/27/2006	Logged by:	GRL
Equipment:	Hitachi Ex 60	Surface Elevation (ft):	402



LOG OF TEST PIT 7



Project: Proposed Central Kitsap Fire and Rescue Facility

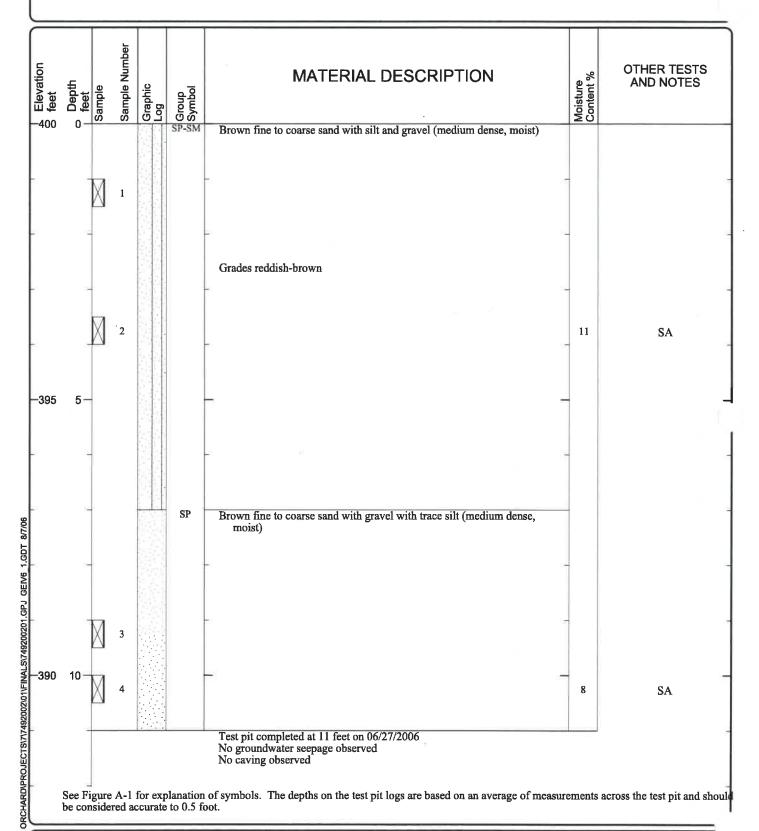
Project Location: Seabeck, Washington

Project Number: 7492-002-01

Figure A-8 Sheet 1 of 1

 Date Excavated:
 06/27/2006
 Logged by:
 GRL

 Equipment:
 Hitachi Ex 60
 Surface Elevation (ft):
 400



LOG OF TEST PIT 8



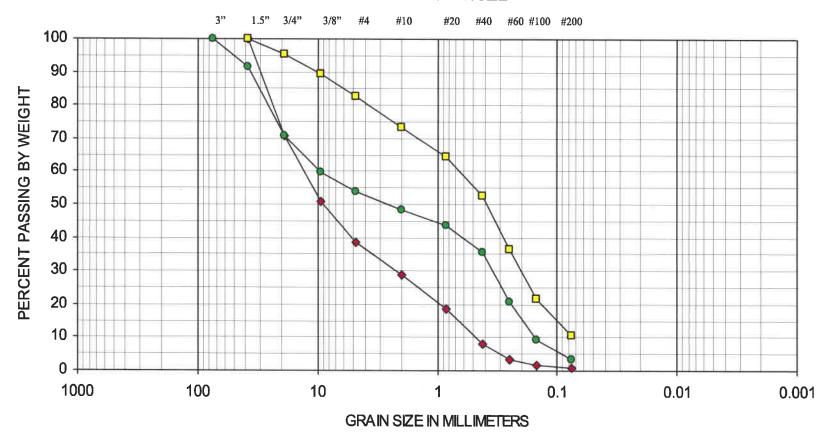
W:\PORT

Project: Proposed Central Kitsap Fire and Rescue Facility

Project Location: Seabeck, Washington
Project Number: 7492-002-01

Figure A-9 Sheet 1 of 1

U.S. STANDARD SIEVE SIZE



CORRIES	GRA	RAVEL SAND			SILT OR CLAY	
COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
•	TP-1 TP-8 TP-8	9 3.5 10	Fine to coarse gravel with sand trace silt (GP) Fine to coarse sand with silt and gravel (SP-SM) Fine to coarse sand with gravel trace silt (SP)



APPENDIX B REPORT LIMITATIONS AND GUIDELINES FOR USE

APPENDIX B REPORT LIMITATIONS AND GUIDELINES FOR USE¹

This appendix provides information to help you manage your risks with respect to the use of this report.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for the exclusive use of Rice, Fergus, Miller Architects and Planners and their authorized agents for the Central Kitsap Fire and Rescue Facility project located at the intersection of NW Holly Road and NW Coho Run near Seabeck, Washington. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the Central Kitsap Fire and Rescue Facility project located near Seabeck, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;
- · composition of the design team; or
- project ownership.

¹ Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.



If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

SUBSURFACE CONDITIONS CAN CHANGE

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or ground water fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

TOPSOIL

For the purposes of this report, we consider topsoil to consist of generally fine-grained soil with an appreciable amount of organic matter based on visual examination, and to be unsuitable for direct support of the proposed improvements. However, the organic content and other mineralogical and gradational characteristics used to evaluate the suitability of soil for use in landscaping and agricultural purposes was not determined, nor considered in our analyses. Therefore, the information and recommendations in this report, and our logs and descriptions should not be used as a basis for estimating the volume of topsoil available for such purposes.

MOST GEOTECHNICAL AND GEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GEOTECHNICAL ENGINEERING REPORT RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

CONTRACTORS ARE RESPONSIBLE FOR SITE SAFETY ON THEIR OWN CONSTRUCTION PROJECTS

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

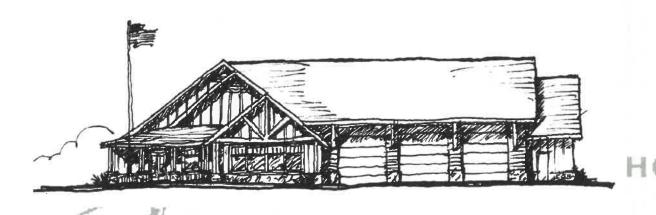
GEOTECHNICAL, GEOLOGIC AND ENVIRONMENTAL REPORTS SHOULD NOT BE INTERCHANGED

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

BIOLOGICAL POLLUTANTS

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention, or assessment of the presence of Biological Pollutants in or around any structure. Accordingly, this report includes no interpretations, recommendations, findings, or conclusions for the purpose of detecting, preventing, assessing, or abating Biological Pollutants. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

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Central Kitsap Fire & Rescue Programming and Planning Services for: New Camp Union Station - Fire Station 99 November 13, 2006



Central Kitsap Fire & Rescue

56

EMAIL TRANSMITTAL



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1550 Woodridge Drive Southeast, Port Orchard, Washington 98366 TELEPHONE: (360) 769-8400, FAX: (360) 769-8700

To: Ed McManamna

Date: 3/15/2006

Rice Fergus Miller Architecture & Planting

262 Fourth Street

File: 07492-002-00

Bremerton, Washington 98337

Email Address: EMcManamna@rfmarch.com

Regarding: Ordinary High Water Mark Delineation Central Kitsap Fire & Rescue Camp Union Station in Kitsap County.

Date	Description
3/15/2006	Letter

Remarks: Please call if you have questions.

Copy To:

Signed:

Lisa Berntsen

lberntsen@geoengineers.com

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March 15, 2006

Rice Fergus Miller Architecture & Planning 262 Fourth Street Bremerton, Washington 98337

Attention: Ed McManamna

Subject: Letter

Ordinary High Water Mark Delineation

Central Kitsap Fire & Rescue Camp Union Station

Kitsap County, Washington File No. 7492-002-00

INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) was contracted by Rice Fergus Miller Architecture and Planning to perform an ordinary high water mark (OHWM) delineation on Big Beef Creek in northwestern Kitsap County. Central Kitsap Fire and Rescue (CKF&R) is planning on building a station near Camp Union, Washington in the SW ¼ of Sec. 5, Township 24 North. Range 01 West, Willamette Meridian. GeoEngineers services were requested to delineate Big Beef Creek to determine the required buffer for the Camp Union Station project. The road NW Coho Run is parallel to Big Beef Creek and separates the creek and the project site.

ORDINARY HIGH WATER MARK DELINEATION

GeoEngineers collected and reviewed the appropriate data prior to conducting the OHWM delineation. The United States Fish and Wildlife Service National Wetland Inventory map was examined for the presence of any wetland features in the project vicinity. There were no wetlands identified in the vicinity of the project. The Washington Department of Natural Resources Forest Practices Application Review System (FPARS) identifies Big Beef Creek as a "Type F" stream (Attachment A). Attachment A shows where Big Beef Creek enters William Symington Lake from the southwest end and exits the lake from the north end. The United States Geological Survey Digital Ortho Quadrangle aerial imagery was examined for vegetation structure and surrounding land use.

The segment of Big Beef Creek delineated runs north from NW Holly Road to NW Symington Parkway. Big Beef Creek flows north and drains into William Symington Lake approximately 1,100 feet north of NW Holly Road. The OHWM delineation started where the creek flows through a 20-foot tall arch culvert under NW Holly Road. For reference, a stream gauge is present on the east side of the creek where the creek exits the culvert. The stream gauge reading at the time of the delineation was 0.7 feet. The delineated OHWM was approximately 1.3 feet higher than the 0.7 feet stream gauge reading.

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Rice Fergus Miller Architecture & Planning March 15, 2006 Page 2

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The vegetation communities along the west side of Big Beef Creek contain both shrub and tree layers. The shrub layer is primarily composed of salmonberry (Rubus spectabilis), western sword fern (Polystichum minitum), slough sedge (Carex obnupta) and small amounts of Himalayan blackberry (Rubus armeniacus). The tree layer contains Western red cedar (Thuja plicata), Douglas fir (Pseudotsuga menziesii), grand fir (Abies grandis) and red alder (Alnus rubra).

CONCLUSION

Big Beef Creek is rated as a Type F stream due to the channel configuration, fish utilization and fish habitat according to Kitsap County standards (Attachment C), which uses the criteria set forth in WAC 222-016-030. The buffer set by the Kitsap County Code Table 19.300.315 (Attachment C) states that a Type F stream must have a 150-foot buffer from the ordinary high water mark. All buffers are required to have a building setback of 15 feet from all buffers associated with the project.

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LIMITATIONS

GeoEngineers has prepared this letter in general accordance with the scope and limitations of our proposal. Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices for biological assessments in this area at the time this report was prepared. No warranty or other conditions express or implied should be understood.

This letter has been prepared for the exclusive use of Rice Fergus Miller Architecture & Planning and their authorized agents and regulatory agencies, following the described methods and information available at the time of the work. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. The information contained herein should not be applied for any purpose or project except the one originally contemplated.

Rice Fergus Miller Architecture & Planning March 15, 2006 Page 3

Thank you for the opportunity to work with you on this project. If you have any questions or comments, please call us at (360) 769-8400.

Sincerely,

GeoEngineers, Inc.

Lisa A. Berntsen, PWS

Principal

LAB:jl

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Attachments: Attachment A - Forest Practices Application Review System Map

Attachment B – Site Photographs

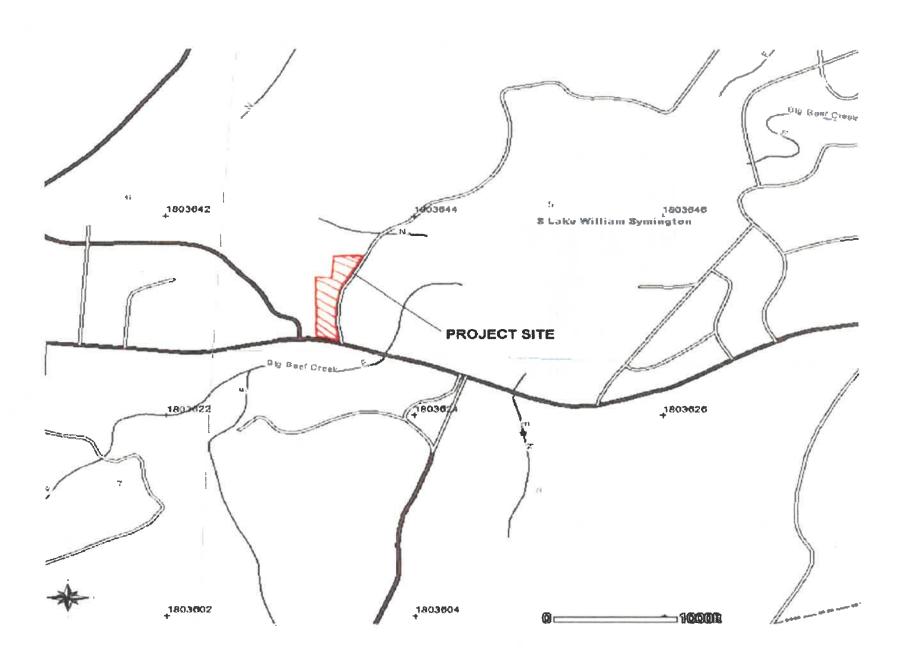
Attachment C - Kitsap County Stream Type and Buffer Standards

Two copies submitted

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ATTACHMENT A
FOREST PRACTICES APPLICATION REVIEW SYSTEM
MAP





ATTACHMENT B SITE PHOTOGRAPHS

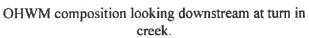






Photograph 6

OHWM composition looking upstream.





Photograph 7

Rain gauge and approximate algae OHWM on side of culvert.



Photograph 8

Bare tree roots on edge of creek.

ATTACHMENT B SITE PHOTOGRAPHS



Photograph 1
Facing north from NW Holly Road.



Photograph 2

Arch culvert under NW Holly Road.



Photograph 3

Looking upstream towards NW Holly Road.



Photograph 4

Cobble and pebble bar on west side of creek.



ATTACHMENT C
KITSAP COUNTY STREAM TYPE AND BUFFER
STANDARDS

ATTACHMENT C KITSAP COUNTY STREAM TYPE AND BUFFER STANDARDS

Table 19.300.315 Fish and Wildlife Habitat Conservation Areas Development Standards

Streams					
Water Type	Buffer Width	Minimum Building Setback			
"S"	200 feet	15 feet beyond buffer			
"F"	150 feet	15 feet beyond buffer			
"Np" 50 feet		15 feet beyond buffer			
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- *(2) "Type F Water" means segments of natural waters other than Type S Waters, which are within the bankfull widths of defined channels and periodically inundated areas of their associated wetlands, or within lakes, ponds, or impoundments having a surface area of 0.5 acres or greater at seasonal low water and which in any case contain fish habitat or are described by one of the following four categories:
 - (a) Waters, which are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type F Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less.
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Date	Description
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Remarks: Please call if you have questions.

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Lisa Berntsen

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Kitsap County, Washington File No. 7492-002-00

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Rice Fergus Miller Architecture & Planning March 15, 2006 Page 2

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Rice Fergus Miller Architecture & Planning March 15, 2006 Page 3

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Lisa A. Berntsen, PWS

Principal

LAB:jl

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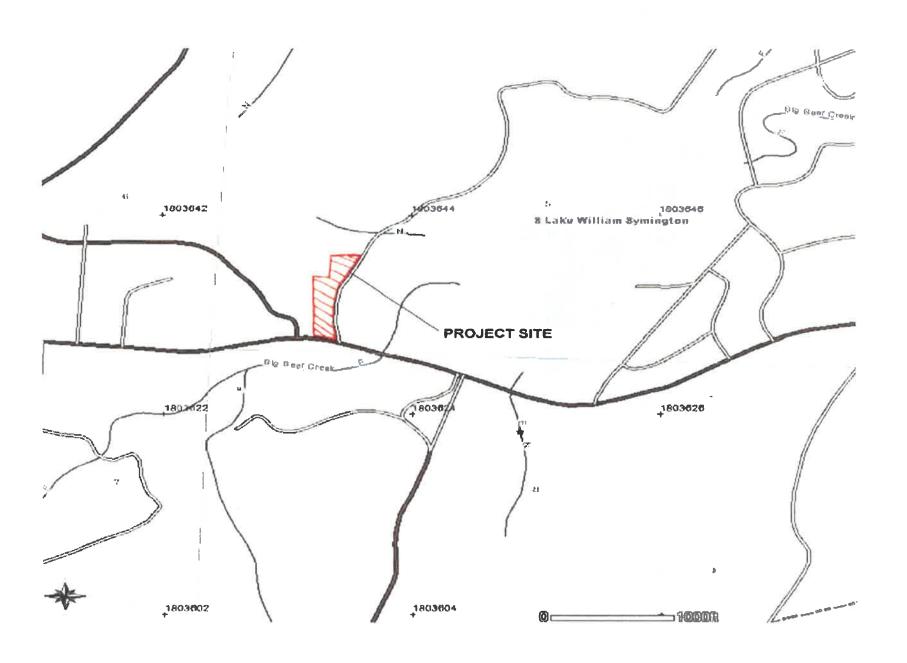
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MAP





ATTACHMENT B SITE PHOTOGRAPHS

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Photograph 1
Facing north from NW Holly Road.



Photograph 2

Arch culvert under NW Holly Road.



Photograph 3

Looking upstream towards NW Holly Road.



Photograph 4

Cobble and pebble bar on west side of creek.



Photograph 5

OHWM composition looking upstream.



Photograph 6

OHWM composition looking downstream at turn in creek.



Rain gauge and approximate algae OHWM on side of culvert.



Photograph 8

Bare tree roots on edge of creek.



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KITSAP COUNTY STREAM TYPE AND BUFFER
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Infiltration Evaluation
Proposed Coho Fire Station

NW Coho Run & NW Holly Road Seabeck, Washington

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LIST OF APPENDICES

Appendix A — Statement of General Conditions Appendix B — Figures Appendix C — Test Pit Logs & Laboratory Analyses

April 17, 2018

1.0 Introduction

In accordance with your authorization, Cobalt Geosciences, LLC (Cobalt) has completed an infiltration evaluation for the proposed Coho Fire Station facility located northwest of the intersection between NW Coho Run and NW Holly Road in Seabeck, Washington (Figure 1).

The purpose of the evaluation was to identify subsurface conditions and to provide recommendations for the proposed infiltration pond/basin.

The scope of work for the geotechnical investigation consisted of a site investigation followed by engineering analyses to prepare this report. We also reviewed a provided geotechnical report for the project prepared by GeoEngineers dated August 7, 2006.

Recommendations presented herein pertain to various geotechnical aspects of the proposed development, including infiltration, drainage, and earthwork.

2.0 Project Description

The project includes construction of a new fire station, parking areas, and stormwater infrastructure. From our review of provided site plans, the fire station will be located in the south half of the property and a stormwater management pond will be situated in the northern portion, between a slope and NW Coho Run. The size and depth of the pond has not been finalized and we should be provided with the plans to determine if additional recommendations are necessary.

3.0 Site Description

The site is located northwest of the intersection between NW Holly Road and NW Coho Run in Seabeck, Washington (Figure 1). The property consists of one irregularly shaped parcel (No. 05240130491001) with a total area of 3.67 acres.

Overall, the site slopes downward from west to east at magnitudes ranging from 10 to 20 percent and topographic relief of about 15 to 20 feet. There are locally steeper slopes in the south that appear to have been created through previous grading activities. Much of the eastern portion of the site is nearly level to gently undulating. These areas are poorly vegetated and appear to have been graded historically.

The property is currently undeveloped and vegetated with Scotch Broom, blackberry vines, grasses, and areas of evergreen and deciduous trees.

The property is bordered to the north and west by undeveloped land and residential properties, to the east by NW Coho Run and to the south by NW Holly Road.

April 17, 2018

4.0 Field Investigation

4.1.1 Site Investigation Program

The geotechnical field investigation program was completed on March 29, 2018 and included excavating and sampling two test pits in the area of the proposed stormwater pond. The geotechnical investigation performed by GeoEngineers in 2006 included excavating eight test pits throughout the property.

The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

A Cobalt Geosciences field representative conducted the explorations, classified the encountered soils, kept a detailed log of each test pit, and observed and recorded pertinent site features.

The results of the test pit explorations and sieve analyses are presented in Appendix C.

5.0 Soil and Groundwater Conditions

5.1.1 Area Geology

The site lies within the Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and non-glacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses.

The <u>Geologic Map of the Wildcat Lake Quadrangle</u>, indicates that the site is located near the contacts of Vashon Glacial Drift and Vashon Recessional Outwash.

Vashon Glacial Till is typically characterized by an unsorted, non-stratified mixture of clay, silt, sand, gravel, cobbles and boulders in variable quantities. These materials are typically dense and relatively impermeable. The poor sorting reflects the mixing of the materials as these sediments were overridden and incorporated by the glacial ice.

Vashon Recessional Outwash consists of fine to medium grained sand with variable amounts of silt and gravel deposited during glacial retreat. These deposits are relatively permeable and are commonly underlain by Vashon Glacial Till.

Test Pits TP-1 & TP-2

Both test pits encountered approximately 3 to 3.5 feet of loose to dense, silty-fine to medium grained sand with gravel and debris (Fill). This layer was underlain by approximately 1.5 to 2 feet of loose to medium dense, silty-fine to medium grained sand with gravel (Weathered Recessional Deposits). These materials were underlain by approximately 2 to 2.5 feet of medium dense, silty-fine to medium grained sand with trace to some gravel (Recessional Deposits).

April 17, 2018

This layer was underlain by medium dense, fine to medium grained sand with gravel and cobbles and local layers of poorly graded gravel with sand (Recessional Deposits), which continued to the termination depths of the test pits.

5.1.2 Groundwater

At the time of our investigation, groundwater was not encountered in either test pit. Based on area topographic maps and our explorations, we anticipate that groundwater is more than 15 feet below the ground surface elevations of our test pits.

We reviewed nearby boring logs that indicate groundwater is likely perched between upper recessional deposits and underlying lacustrine silts and/or other glacially consolidated materials. Groundwater elevations in these borings were approximately 17 to 18 feet below grade, and the ground surface elevations were approximately the same as the subject property (proposed pond area). These groundwater elevations are relatively consistent with the elevation of the nearby Lake William Symington.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project.

6.0 DISCUSSION

6.1.1 General

Infiltration of stormwater is feasible within the underlying outwash soils. The near surface soils within the area of the proposed pond consist of variable thicknesses of fill overlying recessional deposits. We recommend a bottom of basin depth between 7 and 9 feet below existing site elevations.

The geotechnical engineer should be on site to observe excavation of the basin and provide locationspecific recommendations for removal and replacement of unsuitable soils, if necessary. Soil conditions can vary with location and depth; therefore, it is prudent to have the entire basin evaluated during excavation.

7.0 Recommendations

7.1.1 Pond/Basin Construction

The proposed pond is situated near the toe of a moderately steep slope extending downward toward the east. We should be provided with the grading and pond layout plans to determine if additional recommendations are warranted.

Following basin excavation, we recommend re-compacting the uppermost 4 feet of soil along the pond slopes. Compaction should not occur within 3 feet of the proposed bottom of infiltration system elevations as densification will reduce the infiltration rates.

April 17, 2018

We recommend that interior pond slopes have inclinations of 3H:1V (horizontal to vertical). If above-grade berms are proposed, we recommend that all fill be compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method). Fill should be compacted in maximum 12-inch thick loose lifts. Structural fill should have a maximum grain size of 3 inches and be free of wood debris, organics, or other deleterious materials.

Excavation, fill placement, and soil compaction should be periodically monitored by the geotechnical consultant or their representative. Density testing of compacted fill should be performed on each lift of soil.

7.1.2 Infiltration Recommendations

We understand that stormwater runoff will be directed into an infiltration basin located in the northern portion of the property. The soils encountered in our test pits consisted of outwash sands and gravels, which are generally suitable for infiltration of stormwater.

The following table provides relevant soil characteristics typically used for water quality system design:

Exploration Number	Test/Sample Elevation (Feet Below Grade)	Organic Content	Cation Exchange Capacity	Soil Classification (USDA/USCS)
TP-1	8	2.8%	5.6 meq	Sand/SP
TP-2	8	3.1%	6.3 meq	Sand/SP

Infiltration Rate

We performed a Pilot Infiltration Test (PIT) in test pit TP-1 at a depth of about 7 feet below grade to evaluate the in-situ infiltration rates. Following a pre-soak period, we conducted three falling head infiltration tests to determine long term infiltration rates. After application of the required correction factors for site variability (0.33), large-scale PIT (0.75), and influent control (0.9), the lowest design infiltration rate determined through in situ testing was 4.8 inches per hour.

We then excavated the test pits to approximately 15 feet below grade. We did not observe evidence of groundwater mounding or static groundwater in the excavations.

The near surface soils at the site and surrounding areas consist of normally consolidated glacially-derived deposits. These soils have not been consolidated by glaciation and therefore; the hydraulic conductivity equation from Page 527 from the 2014 Department of Ecology Stormwater Management Manual for Western Washington can be utilized to determine the long-term infiltration rate.

Using the hydraulic conductivity equation for select soil sample grain size distributions, we determined long term infiltration rates of 4.5 and 4.6 inches per hour at a depth of 8 feet below grade, which is consistent with the PIT values. We recommend using a maximum 4.5 inches per hour infiltration rate between 7 and 9 feet below existing grade.

April 17, 2018

The soil conditions in our test pits and test pit TP-8 by GeoEngineers (in pond area) were relatively consistent; however, there is a possibility that local areas of fine-grained or other unsuitable soils may be encountered at the bottom of the basin. The condition of the soil unit at the base of the basin should be verified by the geotechnical engineer. We should be provided with final plans for review to determine if the intent of our recommendations has been incorporated or if additional modifications are needed.

7.1.3 Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the
 site soils, to take place during the dry season (generally May through September). However, provided
 precautions are taken using Best Management Practices (BMP's), grading activities can be completed
 during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility
 of sediment entering the surface water. This may include additional silt fences, silt fences with a
 higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

8.0 Construction Field Reviews

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Verify soil conditions and infiltration rates at system locations

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

April 17, 2018

9.0 Closure

This report was prepared for the exclusive use of Rice Fergus Miller and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes, and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of Rice Fergus Miller who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.

Respectfully submitted,

Cobalt Geosciences, LLC Original signed by:



Phil Haberman, PE, LG, LEG Principal

PH/sc

APPENDIX AStatement of General Conditions

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

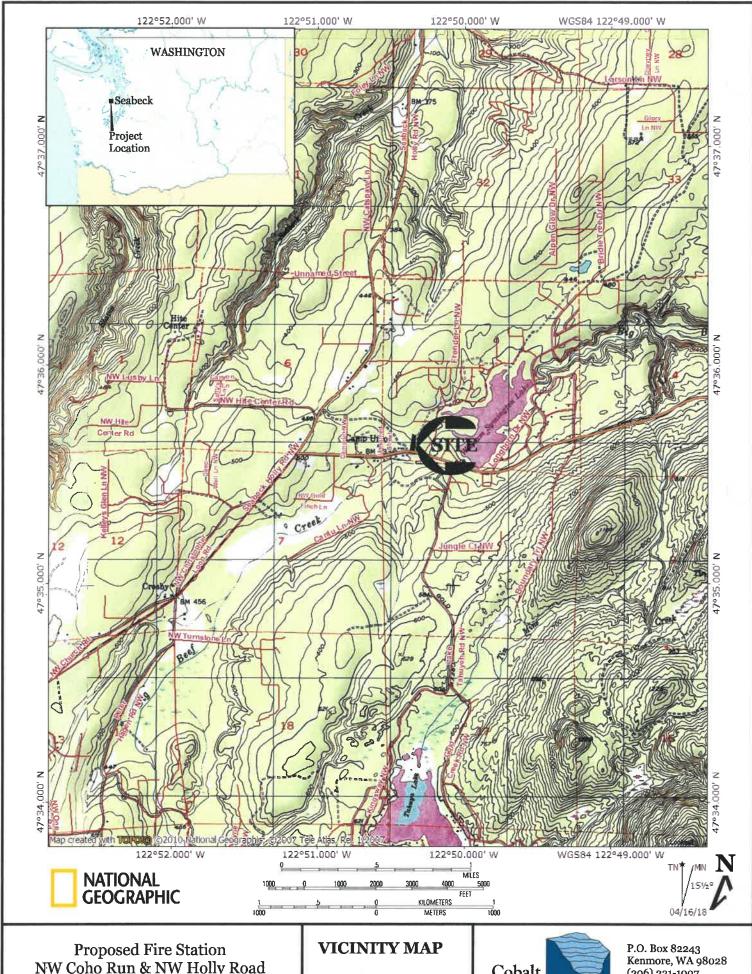
INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

APPENDIX B

Figures: Vicinity Map, Site Plan

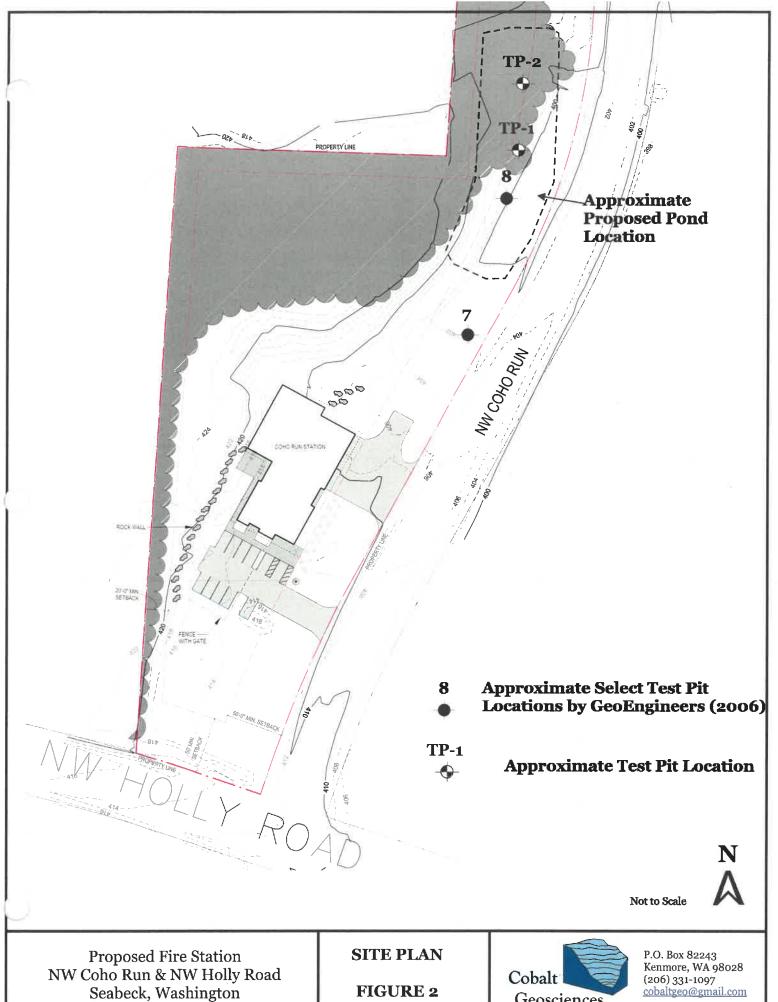


NW Coho Run & NW Holly Road Seabeck, Washington

FIGURE 1

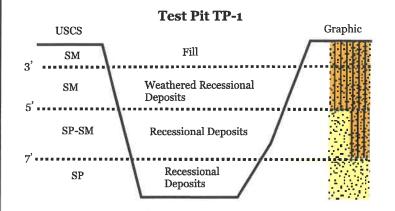


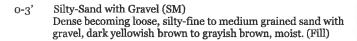
P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 cobaltgeo@gmail.com

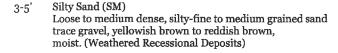




APPENDIX CTest Pit Logs and Laboratory Analyses

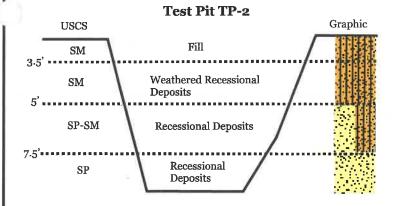






- 5-7' Silty Sand to Poorly Graded Sand with Gravel (SM-SP)
 Loose to medium dense, silty-fine to medium grained sand
 with gravel, yellowish brown to grayish brown, moist.
 (Recessional Deposits)
- 7-15' Poorly Graded Sand with Gravel (SP) Medium dense, fine to medium grained sand with gravel and areas of gravel, grayish brown, moist. (Recessional Deposits)

End of Test Pit 15' No Groundwater Moderate Caving to 6'



- o-3.5' Silty-Sand with Gravel (SM)

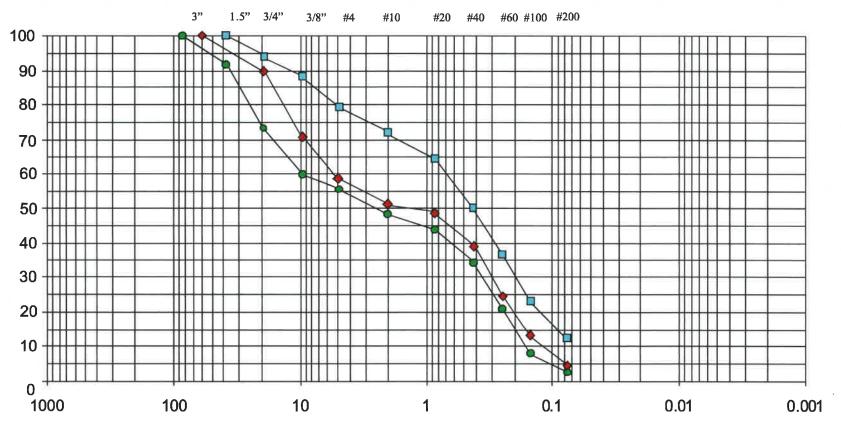
 Dense becoming loose, silty-fine to medium grained sand with gravel, dark yellowish brown to grayish brown, moist. (Fill)
- 3.5-5' Silty Sand (SM)
 Loose to medium dense, silty-fine to medium grained sand trace gravel, yellowish brown to reddish brown, moist. (Weathered Recessional Deposits)
- 5-7.5' Silty Sand to Poorly Graded Sand with Gravel (SM-SP)
 Loose to medium dense, silty-fine to medium grained sand
 with gravel, yellowish brown to grayish brown, moist.
 (Recessional Deposits)
- 7.5-15' Poorly Graded Sand with Gravel (SP)

 Medium dense, fine to medium grained sand with gravel and areas of gravel, grayish brown, moist. (Recessional Deposits)

End of Test Pit 15' No Groundwater Moderate Caving to 5'



US Standard Sieve Size



Grain Size in Millimeters

ſ	COBBLES	GRA	VEL		SAND		SILT OR CLAY
1		COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Exploration	Depth	Soil Classification
•	TP-1 TP-1 TP-2	8 feet 5 feet 8 feet	Fine to medium grained sand with gravel (SP) Silty-fine to medium grained sand with gravel (SM) Fine to medium grained sand with gravel (SP)

Grain Size Analysis Infiltration Estimation

Soil Grain Size Analysis Method (Stormwater Management Manual for Western Washington Vol III, pgs 3-79 and 3-82, Aug 2012):

$$\log_{10}(K_{sat})$$
 -1.57+1.90 D_{10} +0.015 D_{60} -0.013 D_{90} -2.08 f_{fines}

Where, D_{10} , D_{60} and D_{90} are the grain sizes in mm for which 10 percent, 60 percent and 90 percent of the sample is more fine and f_{fines} is the fraction of the soil (by weight) that passes the number-200 sieve (K_{sat} is in cm/s).

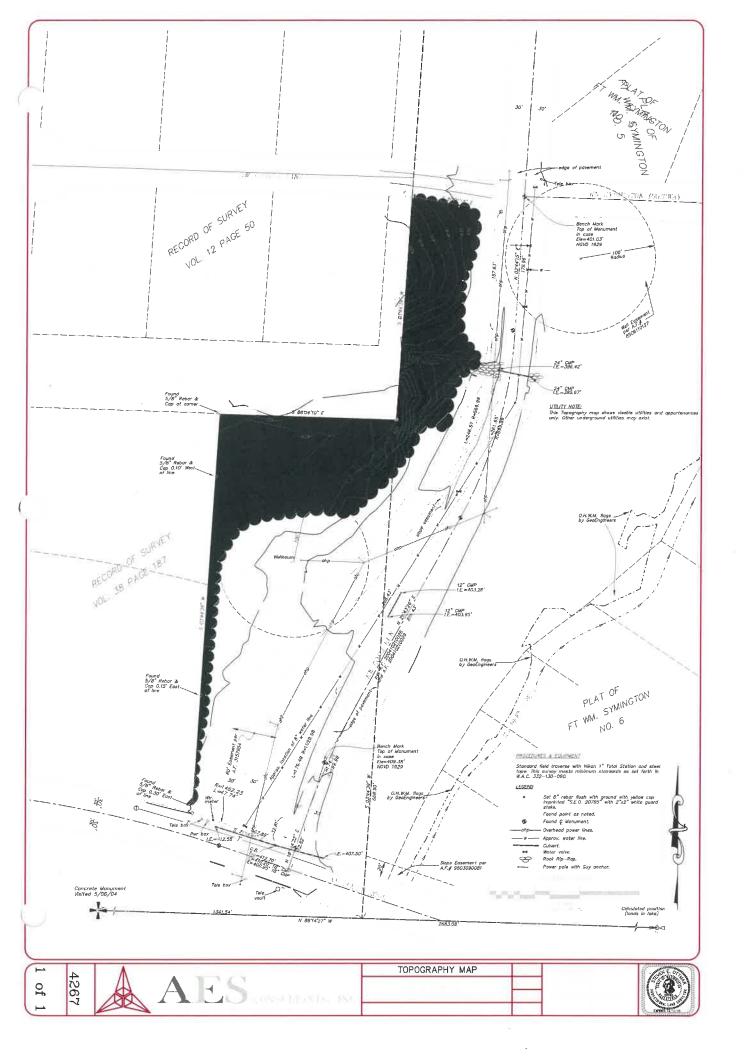
Table 3.3.1 Correction Factors to be Used With In-Situ Satu Measurements to Estimate De-	
Is sma	Partial Correction Factor
Site variability and number of locations tested	CF ₂ = 0.33 to 1.0
Test Method: Large scale PIT Small-scale PIT Other small-scale (e.g. Double ring, falling head) Genius Size Method	CP _t = 0.75 = 0.50 = 0.40 = 0.40
Degree of influent control to prevent siltation and bio- balldup	CE ₆ = 0.9

Total Correction Factor, CFT = CFv x CFv x CFm

CF_T is used in step 5 of the Design of Infiltration Facilities (Section 3.3.4) to adjust the measured (initial) saturated hydraulic conductivity.

 $K_{\text{ sat design}} = K_{\text{saturated}} \times \ CF_T$

	S	D10	D60	D90	Fines	Log10 (Ksat)	K(sat) (cm/s)	K(sat) (in/h)	CF(v)	CF(t)	CF(m)	Correction Factor (total)	Long Term Infiltration Rate (in/h)
TP-1 8 feet		0.14	5.5	20.0	4.0%	-1.5647	0.027	38.62	0.33	0.40	0.90	0.1188	4.6
TP-1 5 feet		0.07	0.7	11.0	13.0%	-1.8399	0.014	20.49	0.33	0.40	0.90	0.1188	2.4
TP-2 8 feet		0.17	10	32.0	3.0%	-1.5754	0.027	37.68	0.33	0.40	0.90	0.12	4.5



Fire Station 64 - Chico

Fire Station 64 was built in 1999. It is approximately 5,300 square feet in size and can accommodate five firefighters and up to four apparatus in its drive-through bay arrangement. There are no community rooms or public spaces at this station.

In 1999, when Fire Station 64 was constructed, it was adjacent to former Fire Station 64, which had been remodeled and repurposed to house the District's central stores and supplies. Parking for the fire station and Central Supply is being accommodated behind and below Central Supply. This practice is expected to continue since the land area surrounding Fire Station 64 is very limited.



Fire Station 64 - Chico 4065 Chico Way, Bremerton, WA 98312

Station 64's property is .94 acres and the Central Supply property is slightly over 2 acres. Both parcels have significant downward slopes toward Chico Way.

While no improvements have been considered or proposed for Central Supply, it is important to note that the two structures share a single septic system and drainfield.

Observed Deficiencies

- Poor and inadequate decontamination facilities
- Poor storage for bunker gear
- Fitness equipment located in bay and subject to diesel exhaust carcinogens
- Station is at risk of being unsafe to occupy in the event of a design-level earthquake
- Inadequate storage for equipment and supplies throughout station
- Materials and finishes are wearing out, especially at restrooms and kitchen
- Lack of adequate office space necessitated commandeering a sleep room
- High energy costs resulting from inefficient light fixtures
- Longer turn out times as a result of two-story arrangement
- Operations support spaces are undersized for station's call volume and commensurate staffing
- Living quarters are undersized for station's call volume and commensurate staffing
- Low level of building security exterior doors, visibility of entrances, parking areas





Proposed Improvements

Phase 1: Immediate Needs

Of the deficiencies noted above, Station 64's seismic status is of the greatest immediate concern. In the event of a major earthquake the operational readiness of this station could be substantially compromised and threaten the health and safety of the building occupants. It is recommended that, at a minimum, Station 64 undergo a seismic retrofit to bring it into compliance with current codes and standards.

The construction costs for undertaking the seismic improvements to Station 64 have been estimated at \$182,457.00.

Phase 2: Deferred Improvements Despite the observed deficiencies noted above, Station 64 continues to deliver excellent emergency services to the community.

The long-range vision for Fire Station 64 would include a significant addition on the backside of the station. This addition would allow those areas most commonly occupied by firefighters



Central Kitsap Fire & Rescue's Central Supply Facility

during daytime hours to be located on the same floor level as the apparatus bay. This will improve turn out time when responding to emergency calls. It will also allow for more appropriately sized kitchen, dining, and dayroom areas, along with firefighter administrative work areas, bunker gear storage, and decontamination facilities. The proposed plan would also include a small lobby where the community could receive blood pressure checks.

End of Fire Station 64 - Chico

Program Needs Checklist Fire Station Remodel Currently Adequate? **Needed Improvements** (Yes/No) Operations Apparatus Bay Decon Shop Clean Project Room App Bay Restroom Bunker Gear Storage General Storage App Bay Janitorial Living Quarters Sleep Rooms Restroom/Showers Kitchen 2 METOWNE LEVEL Dining Dayroom Fitness Laundry Janitorial Public and Front of the House Public Lobby Public Restroom(s) Community / Training Room Firefighter Work Area(s) Private Office(s)



1 LEVEL 1 - FLOOR PLAN

RICEFETGUSMILLER

275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 360-377-8773 RFMARCH.COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE STATION 64 PROJECT ADDRESS CITY NAME, STATE

ROJECT#	3000008.		
PROJE	CT STATUS		
SSUE DATE	JANUARY 1, 20		
REVOLU	OM BEHEINTE		

FLOOR PLAN - LEVEL 1

A21.11

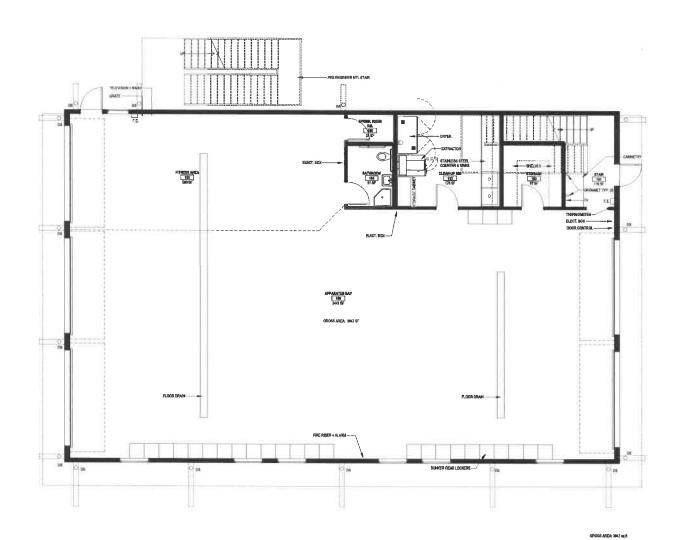


CENTRAL KITSAP FIRE & RESCUE STATION 64 4071 CHICO WAY BREMERTON WA, 98312

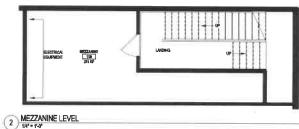


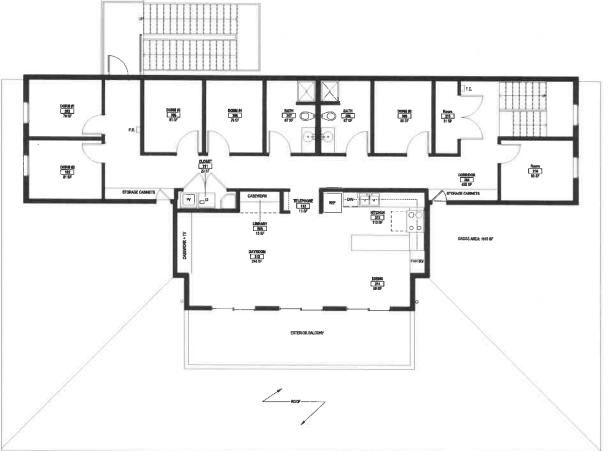
FLOOR PLAN - LEVEL 1

A21.11



1 LEVEL 1 - FLOOR PLAN





RICE OF CUMPLER

275 FIFTH STREET, SUITE 108 BREMERTON, WA 98337 360-377-8773 RFMARCH.COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE STATION 64
4071 CHICD WAY BREMERTON WA, 98312

PROJECT# 00.00000.00 PRE-DESIGN SSUE DATE SEPTEMBER 4, 2016

FLOOR PLAN - LEVEL 2

A21.12



Central Kitsap Fire and Rescue Bond Study 10/2/2019

Station 64-Chico Station 64 Seismic Work

\$ 4,974,230

Total direct Today's Dollars \$ 4,974,230

Exclusions:

Escalation

State Sales Tax

Construction Contingency

Architect/Engineering Fees

Permits

Toxic Soils/Materials Removal

Construction Management Fees

Utility Infrastructure to Site

Piling/Special Foundations

Wetland Mitigation

Jurisdictional/Utility Co. Fees

Owner's Consultant Costs

Equipment & Furnishings Not Listed

Off Site Work

Builders Risk Insurance

Moving/Relocation Expense

Alternative Delivery-GC/CM, Design-Build

Legal Expense

Land Purchase/Financing Costs

Fire Vehicles/Apparatus/Radio Towers

Project/Bid Market/Code Change Contingency

Site Work

Building Additions

Building Remodel



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Station 64 Seismic Summary

Station 64 area: 5,300 S. Rates Current At September 2019

Description		Cost/SF	Total Cost
B10 Superstructure		\$18.90	\$100,192
B20 Exterior Enclosure		\$1.47	\$7,800
C30 Interior Finishes		\$3.50	\$18,550
Z10 General Conditions		\$4.72	\$25,000
	ESTIMATED NET COST	\$28.59	\$151,542
MARGINS & ADJUSTMENTS			
Design Contingency-Remodel	12.0 %		\$18,185
Contractors Overhead & Profit	7.5 %		\$12,730
	ESTIMATED TOTAL COST	\$34.43	\$182,457



Central Kitsap Fire and Rescue Bond Study CKFR Bond Study

Station 64 Seismic Detail

Station 64 area: 5,300 SF Rates Current At September 2019

Descri	ption	Unit	Qty	Rate	Total Cost
B1020	Roof Construction				
380	Upgrade moment frame column	EA	8	2,800.00	22,400
381	Upgrade moment frame beam and connections	EA	6	3,500.00	21,000
382	Upgrade collector under shear wall	LF	64	220.00	14,080
383	Upgrade shear wall connections between floors	LF	124	175.00	21,700
384	Upgrade diaphragm	SF	2,472	8.50	21,012
	Roof Construction			\$18.90/SF	\$100,192
B2030	Exterior Doors				
379	Remove and replace overhead doors	EA	3	2,600.00	7,800
	Exterior Doors			\$1.47/SF	\$7,800
C3010	Wall Finishes				
385	Remove/replace/protect-finishes, MEP @ seismic retrofit	SF	5,300	3.50	18,550
	Wall Finishes			\$3.50/SF	\$18,550
Z1010	General Conditions				
386	General conditions	LS	1	25,000.00	25,000
	General Conditions			\$4.72/SF	\$25,000
	ESTIMATED NET COST			\$28.59/SF	\$151,542



Geotechnical Investigation
Proposed Fire Station 64 Expansion

4071 Chico Way NW Bremerton, Washington

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August 13, 2018

1.0 Introduction

In accordance with your authorization, Cobalt Geosciences, LLC (Cobalt) has completed a geotechnical investigation for the proposed Fire Station 64 building expansion located at 4071 Chico Way NW in Bremerton, Washington (Figure 1).

The purpose of the geotechnical investigation was to identify subsurface conditions and to provide geotechnical recommendations for foundation design, stormwater management, earthwork, soil compaction, and suitability of the on-site soils for use as fill.

The scope of work for the geotechnical evaluation consisted of a site investigation followed by engineering analyses to prepare this report. Recommendations presented herein pertain to various geotechnical aspects of the proposed development, including foundation support of the addition to the building as well as retaining wall design.

2.0 Project Description

We have not received specific information regarding the proposed building expansion; however, based on limited discussions, we understand that a two-story addition will be constructed west of the existing building. The addition will extend into a previously cut natural slope which will require permanent concrete retaining walls.

Anticipated building loads are expected to be light to moderate and site grading will include cuts on the order of 8 feet or less. We should be provided with the grading and structural plans in order to update this report as needed.

3.0 Site Description

The site is located at 4071 Chico Way NW in Bremerton, Washington (Figure 1). The site consists of one rectangular shaped parcel (No 05240120532004) with a total area of about 0.94 acres.

The east-central portion of the site is developed with a fire station building with paved parking areas to the north and south. A rain garden is located east of the building. The west half of the site is undeveloped and consists of a moderately steep slope extending downward toward the east. The slope is about 40 feet in height and has magnitudes of 45 to 55 percent west of the building. The slope magnitudes decrease to the north and south to 20 to 30 percent. The slope is well vegetated with Scotch Broom, Salal, ferns, grasses, and blackberry vines, along with local evergreen and deciduous trees.

There is a short rockery wall (less than 2.5 feet tall) located approximately 12 feet west of the building, near a steel framed exterior stairway. The rockery is constructed with small rocks (less than ½-man).

The site is bordered to the north by fire station facilities, to the west by a single-family residence, to the east by Chico Way NW, and to the south by an access roadway and commercial properties.



August 13, 2018

4.0 Field Investigation

4.1.1 Site Investigation Program

The geotechnical field investigation program was completed on July 27, 2018 and included excavating and sampling two test pits within the property for subsurface analysis.

The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

A Cobalt Geosciences field representative conducted the explorations, collected disturbed soil samples, classified the encountered soils, kept a detailed log of the explorations, and observed and recorded pertinent site features.

The results of the sampling are presented on the test pit logs enclosed in Appendix C.

5.0 Soil and Groundwater Conditions

5.1.1 Area Geology

The site lies within the Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and non-glacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses.

The <u>Geologic Map of Washington – Northwest Quadrant</u>, indicates that the site is underlain by Vashon Glacial Till.

Vashon Glacial Till is typically characterized by an unsorted, non-stratified mixture of clay, silt, sand, gravel, cobbles and boulders in variable quantities. These materials are typically dense and relatively impermeable. The poor sorting reflects the mixing of the materials as these sediments were overridden and incorporated by the glacial ice.

Test Pit Explorations

Both test pits encountered an approximate 6 to 12-inch-thick layer of topsoil and vegetation underlain by approximately 0.5 to 1 feet of loose to medium dense, silty-fine to medium grained sand with gravel (Weathered Glacial Till). These materials were underlain by dense to very dense, silty-fine to medium grained sand with gravel (Glacial Till), which continued to the termination depths of the test pits.

It appears likely that the hillside west of the existing building was re-graded during the most recent construction activities. This work removed most, if not all, of the weathered glacial till from the hillside. This would explain why standing water and seeps are observed on the slope and between the building and the toe of the slope during winter and spring months.



August 13, 2018

5.1.2 Groundwater

Groundwater was not encountered in the test pits. Based on our observations during previous site reconnaissance work, surface water and very shallow perched groundwater is seasonally present below the site area. We previously observed standing water and local seeps flowing from the lower portion of the slope.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project.

6.0 Geologic Hazards

6.1 Steep Slope Hazard

The slope west of the building has a relief of about 40 feet and magnitudes up to 55 percent. The slope area meets the criteria of steep slope and erosion hazard areas. During our assessment, we traversed the slope areas and did not observe evidence of landslide activity. Some trees have curved trunks, indicating that the near-surface materials are undergoing soil creep. We observed areas of standing water near the toe of the slope, which is consistent with perched groundwater between weathered and unweathered glacial till.

The risk of deep-seated landslide activity at the site and adjacent areas is very low. The underlying glacial till is generally dense to very dense and resistant to large-scale movements. However, there is a slight risk of shallow sloughing, particularly when groundwater is present, within the upper 2 to 5 feet of weathered native soils.

We anticipate that the proposed grading and wall construction activities near the toe of the slope will result in additional stability, if constructed per plans and with periodic oversight/monitoring by the geotechnical engineer. In other words, the proposed construction should increase the stability of previously graded steep slope areas by lowering slope magnitudes, removing shallow groundwater seepage, and retaining the toe of the slope areas.

6.2 Erosion Hazard

The <u>Natural Resources Conservation Services</u> (NRCS) maps for Kitsap County indicate that the site is underlain by Alderwood gravelly sandy loam (o to 15 percent slopes). These soils have a slight to moderate erosion potential in a disturbed state. Slopes with magnitudes greater than 15 percent, including excavated areas, would have a moderate to severe erosion potential in a disturbed state.

It is our opinion that soil erosion potential at this project site can be reduced through landscaping and surface water runoff control. Typically erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches and diversion trenches. The typical wet weather season, with regard to site grading, is from October 31st to April 1st. Erosion control measures should be in place before the onset of wet weather.



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6.3 Seismic Hazard

The overall subsurface profile corresponds to a Site Class D as defined by Table 1613.5.2 of the 2015 International Building Code (2015 IBC). A Site Class D applies to an overall profile consisting of dense to very dense soils within the upper 100 feet.

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S , S_I , F_a , and F_v . The USGS website includes the most updated published data on seismic conditions. The site specific seismic design parameters and adjusted maximum spectral response acceleration parameters are as follows:

PGA	(Peak Ground Acceleration, in percent of g)
S_S	149.70% of g
S_1	59.90% of g
F_A	1.00
F_V	1.50

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft/loose soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The relatively dense soil deposits that underlie the site have a low liquefaction potential.

7.0 DISCUSSION

7.1.1 General

The site is underlain by weathered glacial till, which overlie relatively dense native soils. The proposed addition to the existing fire station may be supported on a foundation system bearing on medium dense or firmer native soils and structural fill placed on suitable native soils. We anticipate that bearing soils will be encountered within 2 feet of the ground surface in areas underlain by glacial till.

The underlying soils consist of glacial till which is nearly impermeable. We do not recommend utilizing infiltration devices at this site.

8.0 Recommendations

8.1.1 Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil and fill. Based on observations from the site investigation program, it is anticipated that the stripping depth will be 4 to 12 inches. Deeper excavations will be necessary below large trees and in any areas underlain by undocumented fill materials.

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The native soils consist of silty-sand with gravel. These soils may be used as structural fill provided they achieve compaction requirements and are within 3 percent of the optimum moisture. These soils are typically only suitable for use as fill during the summer months, as they will be above the optimum moisture levels in their current state. These soils are variably moisture sensitive and may degrade during periods of wet weather and under equipment traffic.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

8.1.2 Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 10 feet or less for retaining wall placement. Excavations should be sloped no steeper than 1H:1V (Horizontal:Vertical) in medium dense native soils and 3/4H:1V in dense to very dense native soils. If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 1.5H:1V, where room permits.

Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

Soil conditions may not be completely known from the geotechnical investigation. In the case of temporary cuts, the existing soil conditions may not be completely revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of temporary slopes will need to be re-evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed and required deadlines can be met.

If any variations or undesirable conditions are encountered during construction, we should be notified so that supplemental recommendations can be made. If room constraints or groundwater conditions do not permit temporary slopes to be cut to the maximum angles allowed by the WAC, temporary shoring systems may be required. The contractor should be responsible for developing temporary shoring systems, if needed. We recommend that Cobalt Geosciences and the project structural engineer review temporary shoring designs prior to installation, to verify the suitability of the proposed systems.



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8.1.3 Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the
 site soils, to take place during the dry season (generally May through September). However, provided
 precautions are taken using Best Management Practices (BMP's), grading activities can be completed
 during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility
 of sediment entering the surface water. This may include additional silt fences, silt fences with a
 higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

8.1.4 Foundation & Retaining Wall Design

Foundations

The proposed building expansion may be supported on a shallow spread footing foundation system bearing on undisturbed medium dense or firmer native soils or on properly compacted structural fill placed on the suitable native soils. If structural fill is used to support foundations, then the zone of structural fill should extend beyond the faces of the footing a lateral distance at least equal to the thickness of the structural fill.

For shallow foundation support, we recommend widths of at least 18 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 3,000 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings,

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should be less than ½ inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.40 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 275 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas).

The allowable friction factor and allowable equivalent fluid passive pressure values include a factor of safety of 1.5. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A 1/3 increase in the above values may be used for short duration transient loads.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.

Retaining Walls

The following table, titled **Wall Design Criteria**, presents the recommended soil related design parameters for retaining walls with a level backslope. Contact Cobalt if an alternate retaining wall system is used.

Wall Design Criteria	
"At-rest" Conditions (Lateral Earth Pressure – EFD+)	55 pcf (Equivalent Fluid Density)
"Active" Conditions (Lateral Earth Pressure – EFD+)	35 pcf (Equivalent Fluid Density)
Seismic Increase for "At-rest" Conditions (Lateral Earth Pressure)	21H* (Uniform Distribution)
Seismic Increase for "Active" Conditions (Lateral Earth Pressure)	7H* (Uniform Distribution)
Passive Earth Pressure on Low Side of Wall (Allowable, includes F.S. = 1.5)	Neglect upper 2 feet, then 275 pcf EFD+
Soil-Footing Coefficient of Sliding Friction (Allowable; includes F.S. = 1.5)	0.40

*H is the height of the wall; Increase based on one in 2,500 year seismic event (2 percent probability of being exceeded in 50 years), * EFD – Equivalent Fluid Density

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The stated lateral earth pressures do not include the effects of hydrostatic pressure generated by water accumulation behind the retaining walls. Uniform horizontal lateral active and at-rest pressures on the retaining walls from vertical surcharges behind the wall may be calculated using active and at-rest lateral earth pressure coefficients of 0.3 and 0.5, respectively. A soil unit weight of 125 pcf may be used to calculate vertical earth surcharges.

To reduce the potential for the buildup of water pressure against the walls, continuous footing drains (with cleanouts) should be provided at the bases of the walls. The footing drains should consist of a minimum 6-inch diameter perforated pipe, sloped to drain, with perforations placed down and enveloped by a minimum 6 inches of pea gravel in all directions. Note: a typical footing drain is 4 inches in diameter. We recommend an increase to a 6 inch diameter pipe to manage excess seepage from the adjacent hillside.

The backfill adjacent to and extending a lateral distance behind the walls at least 2 feet should consist of free-draining granular material. All free draining backfill should contain less than 3 percent fines (passing the U.S. Standard No. 200 Sieve) based upon the fraction passing the U.S. Standard No. 4 Sieve with at least 30 percent of the material being retained on the U.S. Standard No. 4 Sieve. The primary purpose of the free-draining material is the reduction of hydrostatic pressure. Some potential for the moisture to contact the back face of the wall may exist, even with treatment, which may require that more extensive waterproofing be specified for walls, which require interior moisture sensitive finishes.

We recommend that the backfill be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. In place density tests should be performed to verify adequate compaction. Soil compactors place transient surcharges on the backfill. Consequently, only light hand operated equipment is recommended within 3 feet of walls so that excessive stress is not imposed on the walls.

8.1.5 Stormwater Management

The site is underlain by Vashon Glacial Till which is nearly impermeable in its unweathered state. Perched groundwater (as interflow) commonly occurs between weathered and unweathered glacial till during the late winter and early spring months. This groundwater often ranges from 3 to 8 feet below existing elevations in areas underlain by till.

We performed an in-situ infiltration test pit in TP-2 at a depth of 3 feet below grade. The unfactored measured infiltration rate was 0.08 inches per hour. This is below what the Washington State Department of Ecology considers feasible for infiltration. Infiltration is not recommended at this site.

Based on our previous observations at the site, the area of the building expansion has seasonal standing water and minor seepage emanating from the slope west of the building. Therefore, due to the subsurface soil and likely seasonal groundwater conditions, infiltration of stormwater runoff is not recommended. We anticipate that additional detention or expansion of the existing rain garden may be necessary to manage runoff from impervious surfaces.

8.1.6 Slab-on-Grade

We recommend that the upper 12 inches of the existing native soils within slab areas be re-compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method). All loose soils, if encountered, should be removed to a depth at least 2 feet below slab areas prior to slab-on-grade preparation.



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Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 200 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined in Section 8.1.

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4 inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from the building and preferably with a relatively impermeable surface cover immediately adjacent to the building.

8.1.7 Groundwater Influence on Construction

Groundwater was not encountered in the test pits. There is a chance that perched groundwater will be encountered during winter months at the site. We anticipate that perched groundwater would be encountered at very shallow depths near the slope area during late winter and early spring months.

If groundwater is encountered, we anticipate that sump excavations and small diameter pumps systems will adequately de-water short-term excavations, if required. Any system should be designed by the contractor. We can provide additional recommendations upon request. The permanent footing drain for the new retaining wall should adequately divert and remove groundwater seepage that flows from the slope.

8.1.8 Utilities

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The contractor is responsible for the safety of open trenches. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

In general, silty and sandy soils were encountered at shallow depths in the explorations at this site. These soils have low cohesion and density and will have a tendency to cave or slough in excavations. Shoring or sloping back trench sidewalls is required within these soils in excavations greater than 4 feet deep.

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All utility trench backfill should consist of imported structural fill or suitable on site soils. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. Depending on the depth and location of the proposed utilities, we anticipate the need to re-compact existing fill soils below the utility structures and pipes. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction procedures.

8.1.9 Pavement Recommendations

The near surface subgrade soils generally consist of silty sand with gravel. These soils are rated as good for pavement subgrade material (depending on silt content and moisture conditions). We estimate that the subgrade will have a California Bearing Ratio (CBR) value of 10 and a modulus of subgrade reaction value of k = 200 pci, provided the subgrade is prepared in general accordance with our recommendations.

We recommend that, at a minimum, 12 inches of the existing subgrade material be moisture conditioned (as necessary) and re-compacted to prepare for the construction of pavement sections. Deeper levels of recompaction or overexcavation and replacement may be necessary in areas where fill and/or loose soils are present.

The subgrade should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. In place density tests should be performed to verify proper moisture content and adequate compaction.

The recommended flexible and rigid pavement sections are based on design CBR and modulus of subgrade reaction (k) values that are achieved, only following proper subgrade preparation. It should be noted that subgrade soils that have relatively high silt contents will likely be highly sensitive to moisture conditions. The subgrade strength and performance characteristics of a silty subgrade material may be dramatically reduced if this material becomes wet.

Based on our knowledge of the proposed project, we expect the traffic to range from light duty (passenger automobiles) to heavy duty (fire trucks). The following tables show the recommended pavement sections for light duty and heavy duty use.

ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT

LIGHT DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **
2.5 in.	6.0 in.	12.0 in.



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HEAVY DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **
5.0 in.	6.0 in.	12.0 in.

PORTLAND CEMENT CONCRETE (RIGID) PAVEMENT

Min. PCC Depth	Aggregate Base*	Compacted Subgrade*
6.0 in.	6.o in.	a 12.0 in.

^{* 95%} compaction based on ASTM Test Method D1557
**A proof roll may be performed in lieu of in place density tests

The asphaltic concrete depth in the flexible pavement tables should be a surface course type asphalt, such as Washington Department of Transportation (WSDOT) ½ inch HMA. The rigid pavement design is based on a Portland Cement Concrete (PCC) mix that has a 28 day compressive strength of 4,000 pounds per square inch (psi). The design is also based on a concrete flexural strength or modulus of rupture of 550 psi.

9.0 Construction Field Reviews

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Observe bearing capacity at foundation locations
- Observe slab-on-grade preparation
- Observe excavation stability

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

10.0 Closure

This report was prepared for the exclusive use of Rice Fergus Miller and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.



August 13, 2018

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes, and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of Rice Fergus Miller who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.

Respectfully submitted,

Cobalt Geosciences, LLC Original signed by:



Exp. 6/26/20 Phil Haberman, PE, LG, LEG Principal PH/sc **APPENDIX A**Statement of General Conditions

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

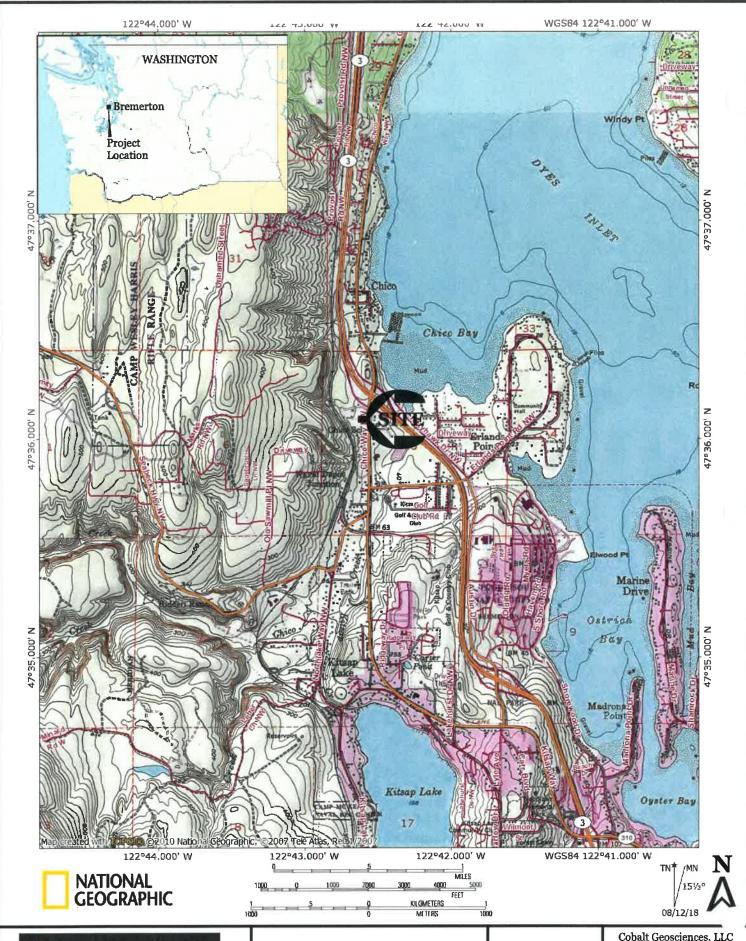
INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

APPENDIX B

Figures: Vicinity Map, Site Plan





Additions to Fire Station 64 4071 Chico Way NW Bremerton, Washington

VICINITY MAP FIGURE 1

Cobalt Geosciences, LLC P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 www.cobaltgeo.com

cobaltgeo@gmail.com



TP-1 Approximate
Test Pit
Location



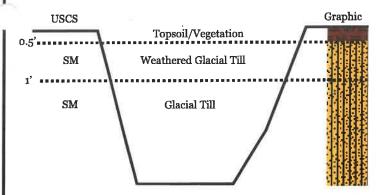


Additions to Fire Station 64 4071 Chico Way NW Bremerton, Washington SITE PLAN
FIGURE 2

Cobalt Geosciences, LLC P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 www.cobaltgeo.com cobaltgeo@gmail.com

APPENDIX C Test Pit Logs

Test Pit TP-1

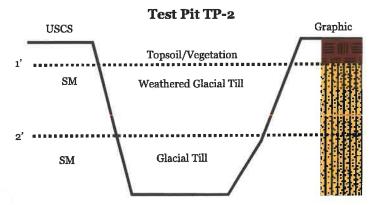


o-o.5' Vegetation/Topsoil

0.5-1' Silty Sand with Gravel (SM)
Loose to medium dense, silty-fine to medium grained sand with gravel, mottled yellowish brown to grayish brown, moist.
(Weathered Glacial Till)

1-4' Silty Sand with Gravel (SM)
Dense to very dense, silty-fine to medium grained sand with gravel, grayish brown, moist. (Glacial Till)

End of Test Pit 4' No Groundwater No Caving

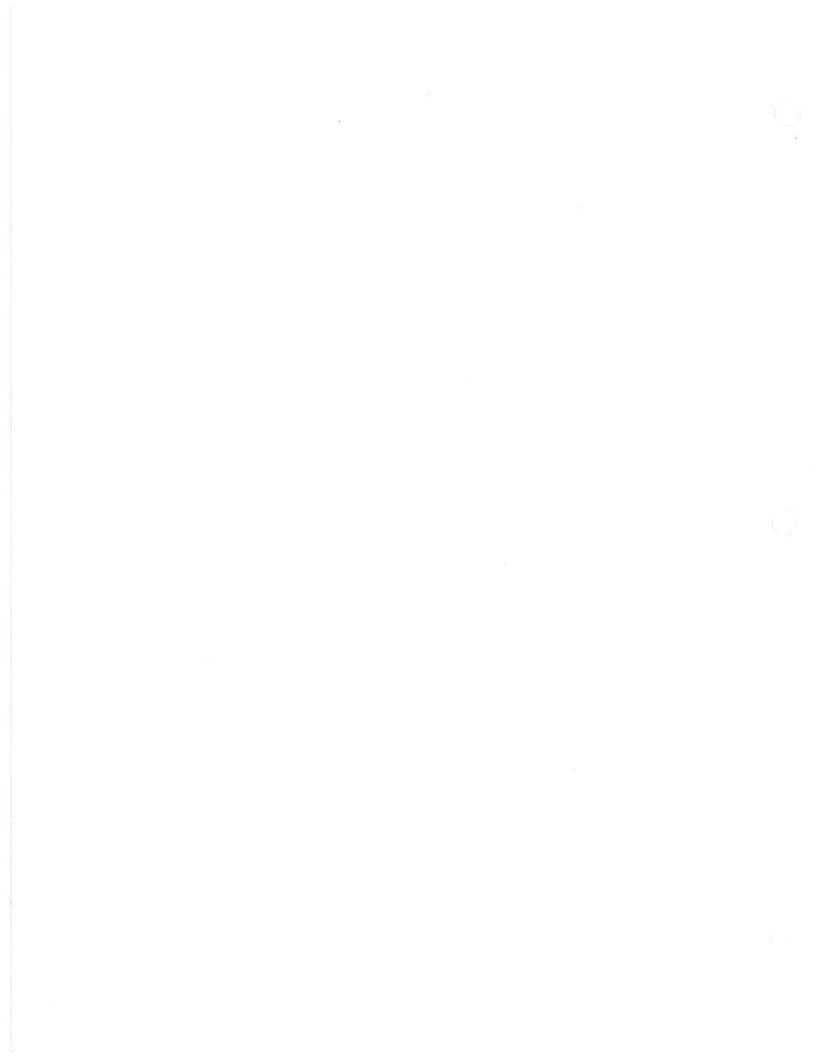


o-1' Vegetation/Topsoil

1-2' Silty Sand with Gravel (SM)
Loose to medium dense, silty-fine to medium grained sand with gravel, mottled yellowish brown to grayish brown, moist.
(Weathered Glacial Till)

2-4' Silty Sand with Gravel (SM)
Dense to very dense, silty-fine to medium grained sand with gravel,
grayish brown, moist. (Glacial Till)

End of Test Pit 4' No Groundwater No Caving





May 7, 2018

Mr. Howard Struve Rice Fergus Miller 275 5th Street, Suite 100 Bremerton, Washington 98337

RE:

Limited Geologic Evaluation

Fire Station 64 4071 Chico Way NW Bremerton, Washington

Dear Mr. Struve,

In accordance with your authorization, Cobalt Geosciences, LLC has prepared this letter to discuss the results of our limited geologic evaluation of a steep slope at the above-referenced location.

Site Description

The site consists of one rectangular shaped parcel (No 05240120532004) with a total area of about 0.94 acres.

The east-central portion of the site is developed with a fire station building with paved parking areas to the north and south. The west half of the site is undeveloped and consists of a moderately steep slope extending downward toward the east. The slope is about 40 feet in height and has magnitudes of 45 to 55 percent west of the building. The slope magnitudes decrease to the north and south to 20 to 30 percent. The slope is well vegetated with Scotch Broom, Salal, ferns, grasses, and blackberry vines, along with local evergreen and deciduous trees.

There is a short rockery wall (less than 2.5 feet tall) located approximately 12 feet west of the building, near a steel framed exterior stairway. The rockery is constructed with small rocks (less than ½-man).

The site is bordered to the north by fire station facilities, to the west by a single-family residence, to the east by Chico Way NW, and to the south by an access roadway and commercial properties.

Area Geology

The Geologic Map of Washington – Northwest Quadrant, indicates that the site is underlain by Vashon Glacial Till.

Vashon Glacial Till is typically characterized by an unsorted, non-stratified mixture of clay, silt, sand, gravel, cobbles and boulders in variable quantities. These materials are typically dense and relatively impermeable. The poor sorting reflects the mixing of the materials as these sediments were overridden and incorporated by the glacial ice.

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Observed Soil Conditions

We excavated a hand boring in the slope area west of the building. We encountered approximately 10 inches of topsoil underlain by about 2.5 feet of loose, silty-fine to medium grained sand with gravel (Weathered Glacial Till). This layer was underlain by medium dense, silty-fine to medium grained sand with gravel (Glacial Till), which continued to the termination depth of the hand boring. Mottled soils and light groundwater seepage was observed about 2.5 feet below grade. We also observed wet areas near the toe of the slope.

Geologic Hazards

Most critical area ordinances designate slopes with magnitudes greater than about 40 percent and vertical relief of at least 10 feet as potentially geologically hazardous (steep slope/landslide hazards).

The slope west of the building has a relief of about 40 feet and magnitudes up to 55 percent. The slope area meets the criteria of steep slope and erosion hazard areas. During our assessment, we traversed the slope areas and did not observe evidence of landslide activity. Some trees have curved tree trunks, indicating that the near-surface materials are undergoing soil creep. We observed areas of standing water near the toe of the slope, which is consistent with perched groundwater between weathered and unweathered glacial till.

The risk of deep-seated landslide activity at the site and adjacent areas is low. The underlying glacial till is generally dense to very dense and resistant to large-scale movements. However, there is a slight risk of shallow sloughing, particularly when groundwater is present, within the upper 2 to 5 feet of weathered native soils.

Conclusions & Recommendations

It is our opinion that there is a slight risk of shallow soil movement within the upper weathered glacial till. To reduce the risk of sloughing, the existing rock wall could be replaced with a larger gravity block wall or cast-in-place concrete wall up to 8 feet in height. Adequate drainage systems behind either type of wall would reduce the presence of standing water between the slope and building. The current rockery provides minimal resistance to soil movements but may remain in place as a landscaping feature.

Below are recommendations for concrete retaining walls. We can provide recommendations for gravity wall design upon request. These systems would likely include Ultra block wall systems which consist of 2.5-feet by 2.5-feet by 5-feet long concrete blocks that interlock in a brick fashion. These types of wall systems are suitable to face relatively dense glacially consolidated soils.

Reinforced Concrete Walls

The following table, titled **Wall Design Criteria**, presents the recommended soil related design parameters for retaining walls with a level backslope. Contact Cobalt if an alternate retaining wall system is used.

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Wall Design Criteria		
"At-rest" Conditions (Lateral Earth Pressure – EFD+)	55 pcf (Equivalent Fluid Density)	
"Active" Conditions (Lateral Earth Pressure – EFD+)	35 pcf (Equivalent Fluid Density)	
Seismic Increase for "At-rest" Conditions (Lateral Earth Pressure)	22H* (Uniform Distribution)	
Seismic Increase for "Active" Conditions (Lateral Earth Pressure)	8H* (Uniform Distribution)	
Passive Earth Pressure on Low Side of Wall (Allowable, includes F.S. = 1.5)	Neglect upper 2 feet, then 275 pcf EFD+	
Soil-Footing Coefficient of Sliding Friction (Allowable; includes F.S. = 1.5)	0.35	
Allowable Soil Bearing Pressure	2,500 psf	

^{*}H is the height of the wall; Increase based on one in 2,500 year seismic event (2 percent probability of being exceeded in 50 years),

The stated lateral earth pressures do not include the effects of hydrostatic pressure generated by water accumulation behind the retaining walls. Uniform horizontal lateral active and at-rest pressures on the retaining walls from vertical surcharges behind the wall may be calculated using active and at-rest lateral earth pressure coefficients of 0.3 and 0.5, respectively (if necessary for the vaults). The soil unit weight of 125 pcf may be used to calculate vertical earth surcharges.

To reduce the potential for the buildup of water pressure against the walls, continuous footing drains (with cleanouts) should be provided at the bases of the walls. The footing drains should consist of a minimum 4-inch diameter perforated pipe, sloped to drain, with perforations placed down and enveloped by a minimum 6 inches of pea gravel in all directions.

The backfill adjacent to and extending a lateral distance behind the walls at least 2 feet should consist of free-draining granular material. All free draining backfill should contain less than 3 percent fines (passing the U.S. Standard No. 200 Sieve) based upon the fraction passing the U.S. Standard No. 4 Sieve with at least 30 percent of the material being retained on the U.S. Standard No. 4 Sieve. The primary purpose of the free-draining material is the reduction of hydrostatic pressure. Some potential for the moisture to contact the back face of the wall may exist, even with treatment, which may require that more extensive waterproofing be specified for walls, which require interior moisture sensitive finishes.

We recommend that the backfill be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. In place density tests should be performed to verify adequate compaction. Soil compactors place transient surcharges on the backfill. Consequently, only light hand operated equipment is recommended within 3 feet of walls so that excessive stress is not imposed on the walls.

www.cobaltgeo.com (206) 331-1097

⁺ EFD - Equivalent Fluid Density

Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented, and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), grading activities can be completed during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the
 possibility of sediment entering the surface water. This may include additional silt fences, silt
 fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration
 systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

Closure

The information presented herein is based upon professional interpretation utilizing standard practices and a degree of conservatism deemed proper for this project. We emphasize that this report is valid for this project as outlined above and for the current site conditions, and should not be used for any other site

Sincerely,

Cobalt Geosciences, LLC

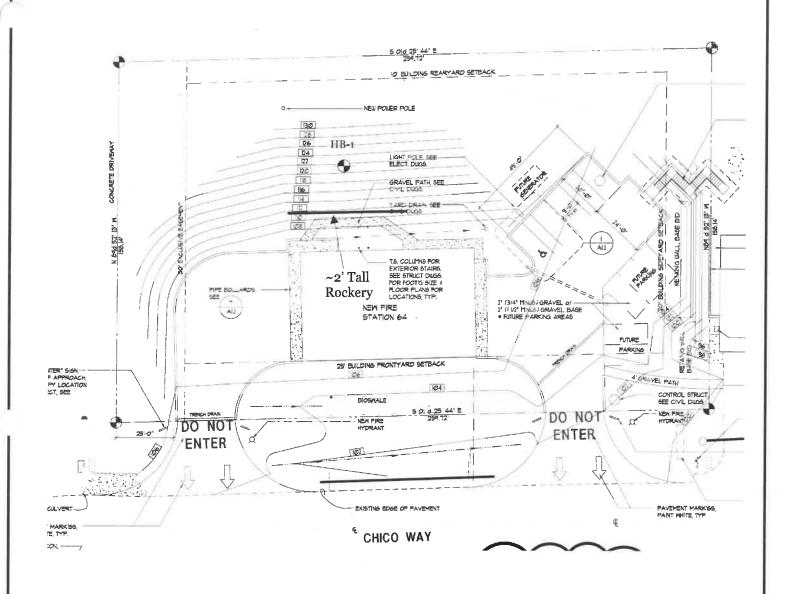


Phil Haberman, PE, LG, LEG Principal

PH/sc

Attachments: Figure 1; Site Plan

<u>www.cobaltgeo.com</u> (206) 331-1097



Approximate Hand Boring Location



Fire Station 64 4071 Chico Way Bremerton, Washington Site Plan Figure 1 Cobalt Geosciences, LLC P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 www.cobaltgeo.com cobaltgeo@gmail.com

FIRE STATION 64 - CHICO WETLAND DELINEATION

SEPTEMBER 6, 2019 BGE19_0720



FIRE STATION 64 - CHICO

WETLAND DELINEATION

SEPTEMBER 6, 2019

PROJECT LOCATION

4071 CHICO WAY

BREMERTON, WA 98312

TAX ACCT: 052401-2-029-2005

SECTION 05, TOWNSHIP 24 N, RANGE 01 E, W.M.

PREPARED FOR
RICE FERGUS MILLER, INC
275 5TH STREET, SUITE 100
BREMERTON WA 98337

Prepared By
BGE ENVIRONMENTAL LLC
2102 Brashem Ave
Bremerton, WA 98310
360.710.6066
www.bgeenvironmental.com

BGE19_0720

LIMITATIONS

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, as a professional wetland scientist licensed to practice as such, is affixed below. All field inspections, jurisdictional wetland boundary delineations, and OHWM determinations were prepared by, or under the direction of Robbyn Myers of BGE Environmental, LLC. All technical information is current to best available science and in conjunction with method and manuals outlined in the methods section. All discussions, conclusion and recommendations reflect the best professional judgment of the author(s) and are based upon information available to us at the time the study was conducted. The findings are subject to verification and agreement by the appropriate local, State and Federal regulatory authorities. No other warranty, expressed or implied, is made.

Robbyn Myers, PWS

Wetland Biologist/Environmental Plane

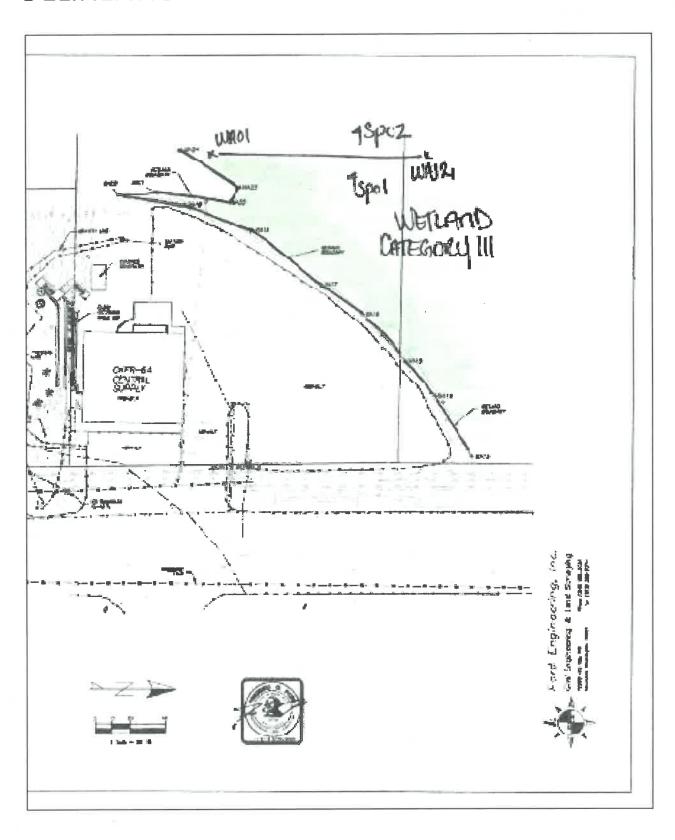
Caseptonibles 2019

Date

FIRE STATION 64 - CHICO WETLAND DELINEATION SEPTEMBER 6, 2019 BGE19 0720



DELINEATION



INTRODUCTION

Rice Fergus Miller, Inc. (Client) requested a wetland delineation to a single parcel located to 4071 Chico Way NW in Bremerton, unincorporated Kitsap County, Washington. The parcel is publicly owned with use assigned to Central Kitsap Fire and Rescue Central Supply facility. Parcel identification is Kitsap County Assessor Tax Parcel Number 052401-2-029-2005. Regional setting is Section 05, Township 24 N, Range 01 E, W.M.

The Client is seeking approval for an addition to Station 64, located to the adjacent parcel south. No improvements are proposed for the Central Supply, although the two structures share a common septic and drainfield, to be rectified.

A single jurisdictional wetland was identified to parcel aligned central to the property and extending off-site to the north. The sloped wetland is Category III. A standard wetland buffer of 150 ft applies.

This wetland delineation report provides confirmation via a determination of jurisdiction and establishment of wetland boundaries and applied provisions pursuant Title 19.200 Kitsap County Code (KCC). This report includes the following:

- Site description and area of assessment;
- Background research and identification of potentially regulated critical areas, wetland and surface waters, in the vicinity of the proposed project;
- Identification, determination, and assessment of jurisdictional wetlands;
- Identification, assessment and criterion analysis for surface waters; and
- Review of regulations and standard buffer requirements for wetlands and Typed waters.

METHODS

Resource information in the public-domain was reviewed for this delineation. Data researched included relevant mapping from U.S. Fish and Wildlife Service, Washington State Department of Fish and Wildlife (WDFW), and Washington Department of Natural Resources (WDNR) Natural Heritage Database, and the Kitsap County GIS mapping resource. Reference sources are summarized in Appendix A.

The wetlands and surface waters were assessed by a Professional Wetland Scientist (PWS) on July 29, 2019. All wetland determinations were completed using observable and documented assessments of vegetation, hydrology, and soils. Wetland boundaries were determined using the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. Wetland Regulatory Assistance Program, Army Corps of Engineer. May 2010. Areas meeting the criteria set forth in the Regional Supplement were determined to be wetland. Soil, Vegetation, and hydrologic parameters were sampled at several locations along the wetland boundary for confirmation of jurisdiction. To mark the boundary between wetlands and uplands, orange surveyor's flagging was alpha-numerically labeled and tied to vegetation or wood lath along the wetland boundary.

Delineated wetlands were classified using the Western Washington Wetland Rating System-2014 by the Department of Ecology (Ecology).

The determination of stream was assessed based on the criterion in BIMC 16.20.190 (Definitions) for Streams. Classification was provided in accordance with Washington Department of Natural Resources water typing system (WAC 222-16-030). Ordinary High Water Mark (OHWM) was confirmed with Ecology method for Determining the Ordinary High Water Mark on streams in Washington State (Olson, 2008). Drainages not associated with wetland conditions were driven by a consistent and observable bed or bank which provided a conservative, yet clear demarcation of a surface water conveyance.

BACKGROUND INFORMATION

RESEARCH AND DATA SYNTHESIS

Background research and data review are essential for the assessment wetlands, surface waters and documented habitat and species within the vicinity of the project site. Data researched included relevant mapping from Kitsap County, U.S. Fish and Wildlife Service, Natural Resources Conservation Service Web Soil Survey, Washington State Department of Fish and Wildlife (WDFW), Washington Department of Ecology, and Washington Department of Natural Resources (WDNR) Natural Heritage Database.

KITSAP COUNTY

GIS maps indicate hydric soils to the eastern portion of the property extending off-site to the north. A Type F water is identified to the east side of Chico Way NW, approximately 100 feet to the north. Moderate landslide hazard areas are on-site to the west.

U.S. FISH & WILDLIFE SERVICE NATIONAL WETLAND INVENTORY (NWI)

The US Fish and Wildlife Service National Wetland Inventory indicates no wetlands within 250 ft of the parcel.

WDNR NATURAL HERITAGE DATABASE

According to Washington Department of Natural Resource (WDNR) records, no threatened or endangered species of plants are recorded as present within Section 05, Township 24 N, Range 01 E, W.M.

WDFW PRIORITY SPECIES AND HABITAT (PHS)

The Washington Department of Fish and Wildlife Priority Habitats and Species database shows a Type F water to the north and opposite side of Chico Way NW. No additional PHS feature were documented as associated within 330 feet.

NATURAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY

Soil series are limited to Alderwood gravelly sandy loam with variable sloped conditions nd Norma fine sandy loam. The following descriptions are representative of these soils.

- (1) Alderwood very gravelly sandy loam, 0 to 6 percent slopes, are a basal till typical to moraines and till plains. They are moderately well drained with a restrictive feature of densic material between 20 and 40 inches depth. They are not prone to flooding or ponding and the water capacity is very low. Minor components include Mckenna, Norma and Shalcar soil series at low percentages (2%). Soils are typically observed as very gravelly ashy loam to 22 inches with inclusion of sand intermixed at greater depths.
- (2) Alderwood very gravelly sandy loam, 6 to 15 percent slopes, are a basal till typical to moraines and till plains. They are moderately well drained with a restrictive feature of densic material between 20 and 40 inches depth. They are not prone to flooding or ponding and the water capacity is very low. Minor components include Mckenna, Norma and Shalcar soil series at low percentages (2%). Soils are typically observed as very gravelly ashy loam to 22 inches with inclusion of sand intermixed at greater depths.
- (37) Norma fine sandy loam is alluvium material with some volcanic ash in the upper part. Typically found within depressional landforms this soil series is poorly drained with a restricted feature at depths greater than 80 inches. Depth to water table is at the surface (0 inches) with no expected flooding but frequent ponding. This soil series is usually associated with Bellingham, Mckenna and Shalcar soil series.

EXISTING CONDITIONS

The parcel is partially developed along its frontage to Chico Way NW with the Central Supply facility for Central Kitsap Fire and Rescue. The supply structure includes a parking area aligned to the north and set lower in elevation to the existing development. The property use is limited to the eastern quarter of the parcel acreage. Existing use is delineated at an immediate mature deciduous canopy. The canopy hosts a ditch, jurisdictional wetlands, and moderate slopes.

FINDINGS

WETLAND DELINEATION

The subject parcel was originally assessed on March 21, 2019. The typical ambient temperatures ranged from 36° to 59° F. The field assessment and wetland determinations and delineations were conducted by Robbyn Myers, a Professional Wetland Scientist (#1286 Certification under the Society of Wetland Scientists). A routine wetland delineation was performed. A summary of precipitation leading to the field review and throughout the month is provided below.

Precipitation Summary: March 2019

	Total Monthly Precipitation	Precipitation One Week Prior	Precipitation Two Weeks Prior	Average Monthly Precipitation	Deviation from Monthly Average
March 21	0.92 inches	0.0 inches	0.25 inches	0.87 inches	- 0.05 inches

https://www.usclimatedata.com/climate/bremerton/washington/united-states/uswa0041/2019/7

The site investigation confirmed one wetland to the west immediately off the existing use. This wetland continues off-site to the north and surface waters are directed to right-of-way ditches.

WETLAND A

Wetland A is a sloped complex set to the hill side on the subject property. Hydrology and hydrophyte dominance is immediate to the topography and observed at the shoulder of what appears to be an old road bed. The canopy is closed mature deciduous trees and the understory dense. The interior is mixed shrubs and areas of dense persistent emergents. Soils are super saturated with pockets of inundations. Shallow surface flow is braided intermittently within the prevailing topography. Vegetation observed included red alder (*Alnus rubra*, FAC), salmonberry (*Rubus spectabilis*, FAC), Cherry laurel (*Prunus laurocerasus*, NL), creeping buttercup (*Ranunculus repens*, FACW), devil's club (*Opiopanax horridus*, FAC+), English ivy (*Hedera helix*, FACU), giant horsetail (*Equisetum telmateia*, FACW), Field horsetail (*Equisetum arvense*, FAC), lady fern (*Athyrium filix-femina*, FAC), and youth-on-age (*Tolmiea menziesii*, FAC). Soils are very dark brown loam with chroma 10YR 3/1 for eight (8) inches of loam. Depleted conditions were prominent to the remainder of the profile where composition was clay loam. Soils were saturated at the surface.

Wetlands are assigned a numeric score based on the combined scores for site, landscape potential and for society value. The numeric score determines the category rating of the wetland. Regulatory code then uses the rating for such issues as the width of buffers needed to protect the wetland from adjacent development, the amount of mitigation needed to compensate for impacts to the wetland and permitted uses in the wetland. Results of the project area wetland are summarized below.

	Water Quality Improvement	Hydrologic Function	Habitat Function
Site Potential	Medium	Low	Medium
Landscape Potential	Medium	Medium	Low
Societal Value	High	Low	Medium

The wetlands Hydrogeomorphic (HGM) classification is sloped. Cowardin definition is palustrine forested, PFO. The wetland was rated as a Category III with a Habitat value of 5.

NON WETLAND

The non-wetland portions of the canopy include bigleaf maple (*Acer macrophyllum*, FACU), red alder (*Alnus rubra*, FAC), salmonberry (Rubus spectabilis, FAC), lady fern (*Athyrium cuclosorum*, FAC), deer fern (*Blechnum spicant*, FAC+), English ivy (*Hedera helix*, FACU), holly (*Ilex aquifolium*, FACU), bitter dock (*Rumex obtusifolius*, FAC), Indian plum (*Oemleria cerasiformis*, FACU), Devil's club (*Opiopanax horridus*, FAC+), Lily-of-the-valley (*Maianthemum dilatatum*, FAC), youth-on-age (*Tolmiea menziesii*, FAC), sword fern (*Polystichum munitum*, FACU), and cherry laurel (*Prunus laurocerasus*, NL). Soils were uniform light brown to fourteen (14) inches. Composition is loam. The absence of hydrologic conditions or indicators confirmed the non-wetland landscape.

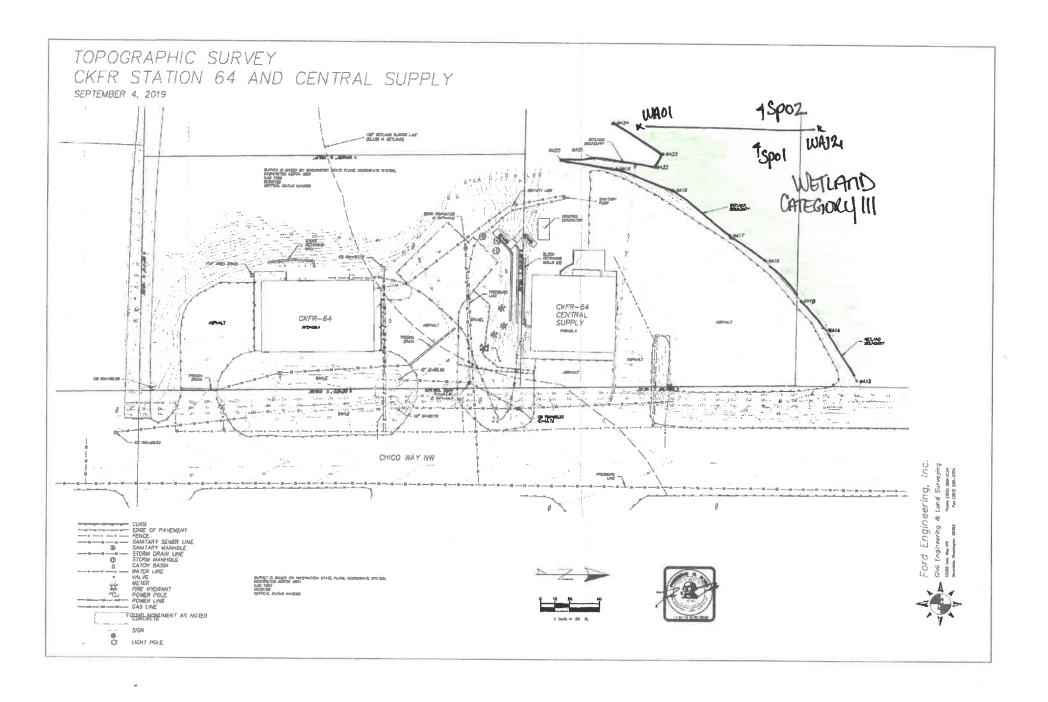
REGULATORY REQUIREMENTS

Wetland buffers are based on three factors: the wetland category, the wetland habitat score, and the impact of proposed land use intensity. Wetland A was rated as Category III with a habitat score of 5. The proposed land use is maintained with high intensity, improved. A standard buffer width of 150 ft (Table 19.220.220(C) KCC).

All buffers shall be measured horizontally from a perpendicular line established at the wetland edge or stream bank-full width. A 15-ft building or impervious surface setback is required from the edge of any critical area buffer. The setback shall be identified on a site plan.

Buffers shall remain as undisturbed or enhanced vegetation areas for the purpose of protecting the integrity, function, and value of the critical area habitat and/or species use. Any buffer modification proposed shall comply in accordance with development standards provided that the applicant demonstrates the need for modification through mitigation sequencing; avoid, minimize, or mitigate. Equal or greater function and value must be demonstrated through buffer width averaging or buffer width reduction.

WETLAND SUMMARY					
	一头式	RATING	111		
	WETLAND SIZE	< 2.5 acres			
		COWARDIN	PFO		
		WETLAND DATA	SP01		
		NONWETLAND DATA	SP02		
	WETLAND DETERMINATION	2			
VEGETATION	Dominance test is greater than 50	0%			
SOILS	Depleted Matrix (F3)				
HYDROLOGY	Surface Water (A1) and Saturation	n (A3)			
DELINEATION RATIONALE	Distinct depression in the landsca Facultative dominance is prevalen		arks and		
	WETLAND RATING				
HGM CLASS	Slope				
MAPPING TOOL	MAPPING TOOL Google & KCGIS				
IMPROVING WATER QUALITY	7				
HYDROLOGIC	4				
HABITAT 5					



PHOTOGRAPHS



EXISTING USE VIEW SOUTH TO NORTH. WETLAND IS IMMEDIATE TO THE VEGETATION LINE



NONWETLAND SLOPE FACE



VIEW FROM WETLAND BOUNDIARY TO EXISTING USE THROUGH BLACKBERRY ECOTONE



WETLAND TO USE INTERFACE TYPICAL



WETLAND ECOTONE AT INTERIOR (NATURAL); TYPICAL

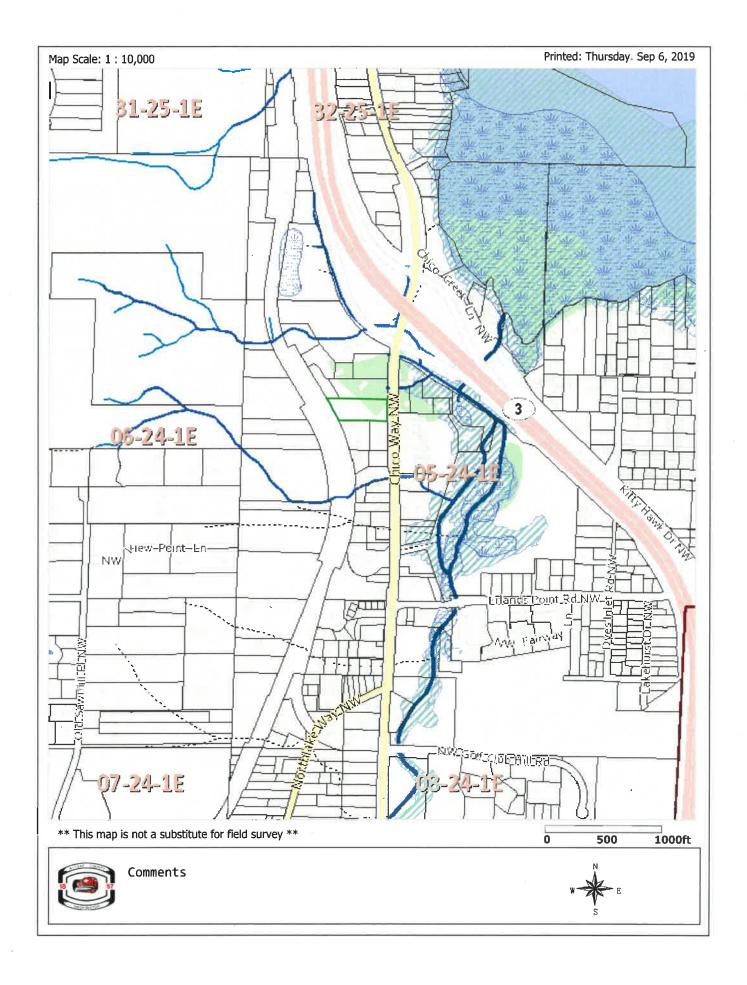


WETLAND INTERIOR WITH COMPLEX STRATA

APPENDIX A – REFERENCE SOURCES

WETLAND DELINEATION	ON	
USACE 1987	http://el.erdc.usace.army.	Environmental Laboratory, 1987. Corps of Engineers Wetlands
Wetland	mil/elpubs/pdf/wlman87.p	Delineation Manual. Technical Report Y-87-1, US Army Engineer
Delineation Manual	df	Waterways Experiment Station, Vicksburg, Mississippi.
Western Mountains,	http://www.usace.army.m	U.S. Army Corps of Engineers. 2010. Regional Supplement to the
Valleys, and Coast	il/CECW/Documents/cecw	Corps of Engineers Wetland Delineation Manual: Western
Region Interim	o/reg/west_mt_finalsupp.	Mountains, Valleys, and Coast Region (Version 2.0), ed. J. S.
Regional	pdf	Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3.
Supplement		Vicksburg, MS: U.S. Army Engineer Research and Development
		Center.
WETLAND CLASSIFICA	TION	
USFWS / Cowardin	http://www.fws.gov/nwi/P	Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979.
Classification	ubs_Reports/Class_Manua	Classification of wetlands and deepwater habitats of the United
System	l/class_titlepg.htm	States. Government Printing Office, Washington, D.C.
Hydrogeomorphic	http://el.erdc.usace.army.	Brinson, M. M. (1993). "A hydrogeomorphic classification for
Classification	mil/wetlands/pdfs/wrpde4	wetlands," Technical Report WRP-DE-4, U.S. Army Engineer
(HGM) System	.pdf	Waterways Experiment Station, Vicksburg, MS.
WETLAND RATING		
Washington State	https://fortress.wa.gov/ec	Hruby. 2014 Update. Washington State wetland rating system
Wetland Rating	y/publications/SummaryPa	for western Washington –Revised. Publication #14-06-029.
System	ges/1406029.html	
WETLAND INDICATOR	STATUS	
Northwest (Region	http://www.fws.gov/nwi/b	Reed, P.B. Jr. 1988. National list of plant species that occur in
9) (Reed, 1988) and	ha/list88.html	wetlands: Washington. Biological Report NERC-88/18.47 for
Northwest (Region		National Wetlands Inventory, Washington, D.C.
9) Supplement		Reed, P.B. Jr. 1993. Northwest supplement (Region 9) species
(Reed et al., 1993)		with a change in indicator status or added to the Northwest
		1988 list, wetland plants of the state of Washington 1988. U.S.
		Department of Interior Fish and Wildlife Service WELUT - 88
		(26.9), Washington, D.C.
SOILS DATA		
NRCS Soil Survey	http://websoilsurvey.nrcs.	Website GIS data based upon:
	usda.gov/app/WebSoilSurv	McMurphy, Carl J. 1980. Soil Survey of King County,
	ey.aspx	Washington. United States Department of Agriculture, Soil
		Conservation Service in cooperation with Washington State
		Department of Natural Resources.
THREATENED AND EN		
Washington Natural	http://www.dnr.wa.gov/n	Washington Natural Heritage Program (Data published
Heritage Program	hp/	10/15/08). Endangered, threatened, and sensitive plants of
	and	Washington. Washington State Department of Natural
	http://www1.dnr.wa.gov/	Resources, Washington Natural Heritage Program, Olympia, WA
	nhp/refdesk/datasearch/w	
	nhpwetlands.pdf	
Washington Priority	http://wdfw.wa.gov/hab/p	Priority Habitats and Species (PHS) Program Washington
Habitats and	hspage.htm	Department of Fish and Wildlife (WDFW).
Species		







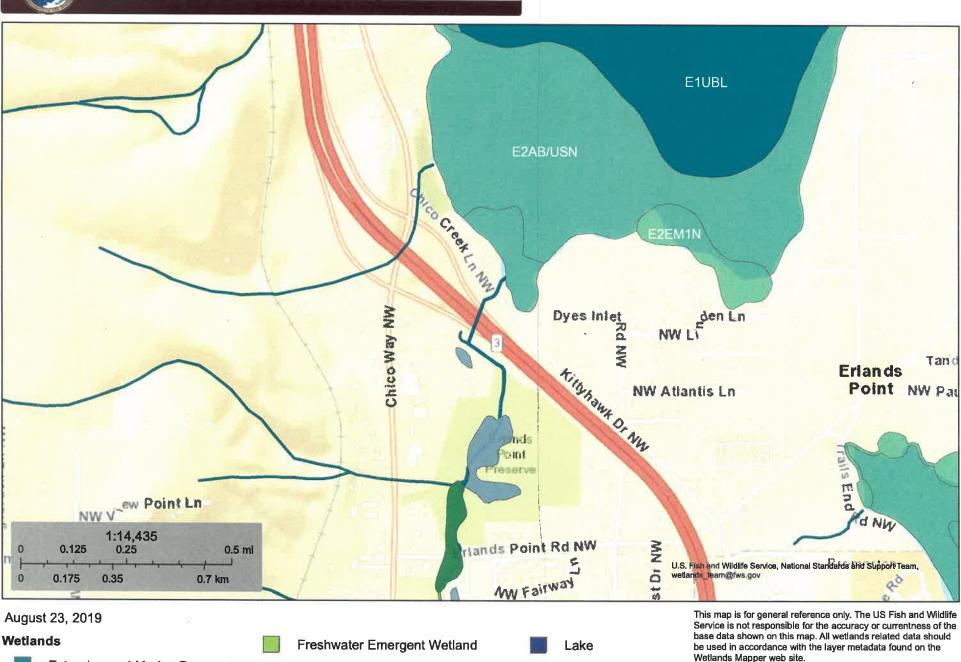
Estuarine and Marine Deepwater

Estuarine and Marine Wetland

Wetlands

Other

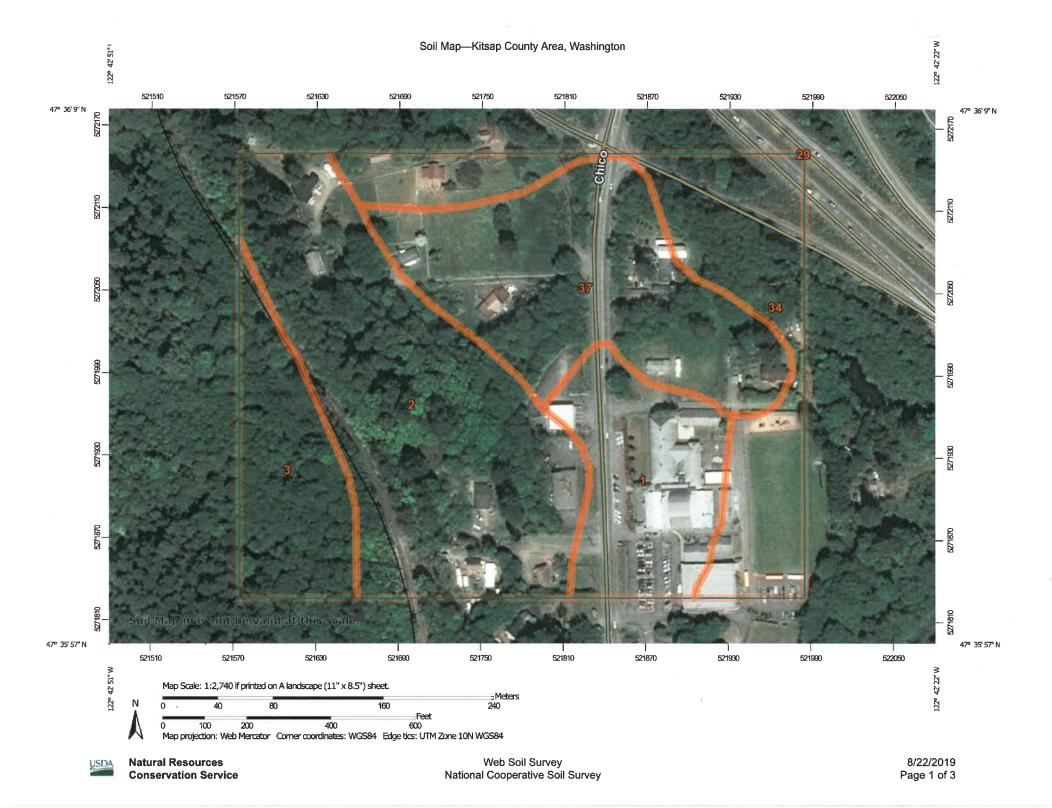
Riverine



Freshwater Forested/Shrub Wetland

Freshwater Pond

National W Inventory (NWI)
This page was produce the NWI mapper



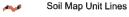
MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons



Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot â

Very Stony Spot a

Wet Spot

Other Δ

Special Line Features

Water Features

Streams and Canals

Transportation

Rails +++

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kitsap County Area, Washington Survey Area Data: Version 14, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

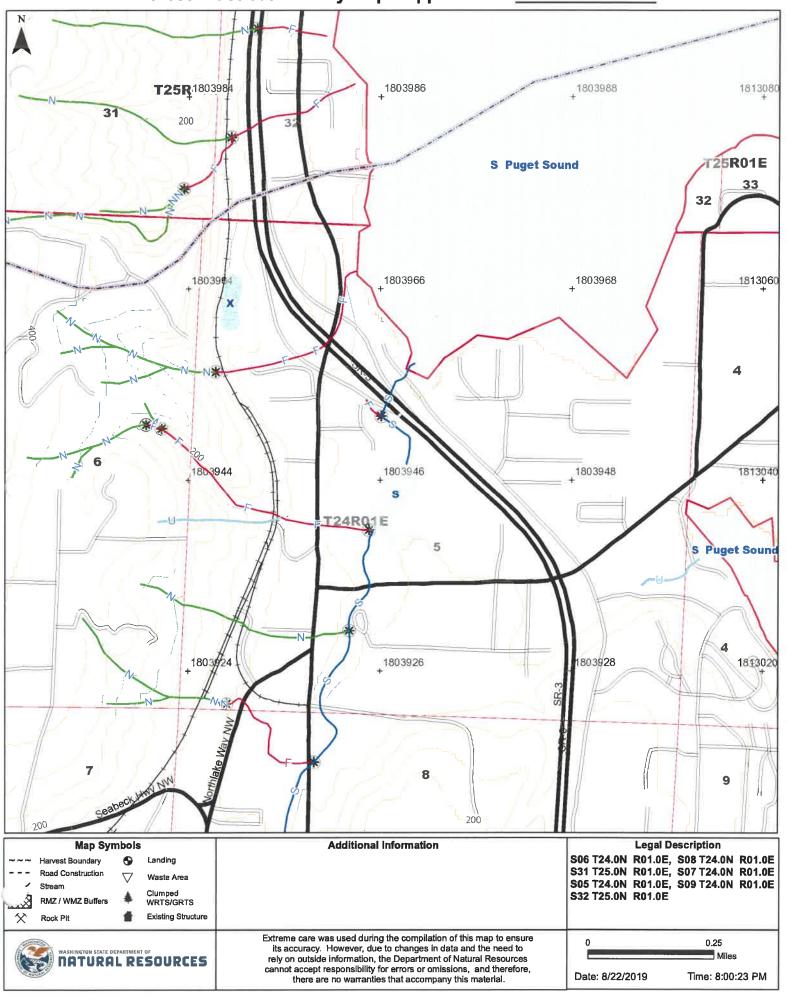
Date(s) aerial images were photographed: Aug 9, 2018—May 23, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alderwood gravelly sandy loam, 0 to 8 percent slopes	4.3	12.9%
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	11.0	33.2%
3	Alderwood gravelly sandy loam, 15 to 30 percent slopes	3.6	10.9%
29	Kitsap silt loam, 8 to 15 percent slopes	0.0	0.0%
34	Neilton gravelly loamy sand, 0 to 3 percent slopes	6.5	19.6%
37	Norma fine sandy loam	7.7	23.4%
Totals for Area of Interest	1	33.0	100.0%

Forest Practices Activity Map - Application #_____



APPENDIX B DATA FORMS WETLAND DETERMINATION

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: 4071 CHCO UAY M	City/County:	Pren	Sampling Date: 07.26.19
OI Par Diala	CT		State: LA Sampling Point: State
Donipos ACC.	Section To	mehin Pana	6 05-24-01F
Investigator(s): Proyers Roce Landform (hillslope, terrace, etc.): 8000 800	O Local relief	(concave co	nvex none): none): None (%): 2-5
^	Local relies	(concave, co	Long: Datum:
Subregion (LRR):			NWI classification: NWI classification
Are climatic / hydrologic conditions on the site typical for this			(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology sig			ormal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology na	turally problematic?	(If nee	ded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map s	howing samplin	g point lo	cations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes Yes No		- Ownerlad (A
Hydric Soil Present? Yes X No	with	e Sampled A	1? Yes K No
Wetland Hydrology Present? Yes No			
Remarks: Seep & depressiona	e comple	eb; d	itched (x). Deep soup
a depressions we emer	sent ait	side '	gρ. '
VEGETATION – Use scientific names of plant	s.		
1000		Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10m) 1. +Ca -Alder	% Cover Species?	FAU	Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2.			Total Number of Dominant
3.			Species Across All Strata: (B)
4.	9/		Percent of Dominant Species
Saaling/Shrub Stratum (Plot size: 3m	= Total Co	over	That Are OBL, FACW, or FAC: (A/B)
1. DA Men berry	20 4	FAC	Prevalence Index worksheet:
			Total % Cover of: Multiply by:
2			OBL species x1=
4			FACW species x 2 =
5.			FAC species x3 =
7	ZO = Total Co	over	FACU species x 4 = UPL species x 5 =
Herb Stratum (Plot size: Om)	100	LACIO	Column Totals: (A) (B)
1. Chart Dorsetou	10 11	IAC	
3. Youth on the	90 11	FAC	Prevalence Index = B/A = Hydrophytic Vegetation Indicators:
	- 	17.10	1 - Rapid Test for Hydrophytic Vegetation
5.			✓ 2 - Dominance Test is >50%
6.			3 - Prevalence Index is ≤3.0¹
7			4 - Morphological Adaptations¹ (Provide supporting
8			data in Remarks or on a separate sheet)
9.			5 - Wetland Non-Vascular Plants1
10			Problematic Hydrophytic Vegetation¹ (Explain)
11	TAC		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
We will a Observer (Distriction 1300)	Total Co	over	
Woody Vine Stratum (Plot size:)	100 U	FACIL	Hydrophytic
1. 0 100	- 1	- 11.00	Vegetation
	OO = Total C	очег	Present? Yes K No
% Bare Ground in Herb Stratum			
Remarks:			

	the depth needed to document the indicator or confirm	nie draging di maramarai
epth Matrix nches) Color (moist)	% Color (moist) % Type Loc²	Texture Remarks
color (moist)	1000	109m
505 100 12 1	80% 104831610% mm	Sciaulam
o lugarit	15 W THINK W	7 augus
	1070 hy	
	1 = +=	
vpe: C=Concentration, D=Deple	tion, RM=Reduced Matrix, CS=Covered or Coated Sand Gr	ains. ² Location: PL=Pore Lining, M=Matrix.
ydric Soil Indicators: (Applicat	ole to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Redox (S5)	2 cm Muck (A10)
Histic Epipedon (A2)	Stripped Matrix (S6)	Red Parent Material (TF2)
Black Histic (A3)	Loamy Mucky Mineral (F1) (except MLRA 1)	
_ Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Other (Explain in Remarks)
_ Depleted Below Dark Surface		3
_ Thick Dark Surface (A12)	Redox Dark Surface (F6)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present,
_ Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7) Redox Depressions (F8)	unless disturbed or problematic.
Sandy Gleyed Matrix (S4) estrictive Layer (if present):	Redux Deplessions (r o)	Unless distance of problemate.
Type:		· L
		I bedete Call Descents Voc V No
Depth (inches):		Hydric Soil Present? Yes V No No
Depth (inches):		Hydric Soil Present? Yes V No
Depth (inches):		Hydric Soil Present? Yes V No
Depth (inches):Remarks:		
Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicators:	e required; check all that apply)	Hydric Soil Present? Yes V No Secondary Indicators (2 or more required)
Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on	e required; check all that apply) Water-Stained Leaves (B9) (except	Secondary Indicators (2 or more required)
Depth (inches): Permarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on X Surface Water (A1)		Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B)
Depth (inches): Permarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on X Surface Water (A1) High Water Table (A2)	Water-Stained Leaves (89) (except	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1,
Depth (inches): Permarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on X Surface Water (A1) High Water Table (A2)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B)
Depth (inches): Primary Indicators (minimum of on March Water (A1) High Water Table (A2) Saturation (A3)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 4A, and 4B) Dralnage Pattems (B10) Dry-Season Water Table (C2)
Depth (inches): Property Policy Indicators: Primary Indicators (minimum of on Management of Manage	 Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) 	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 4A, and 4B) Dralnage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C
Depth (inches): Primary Indicators (minimum of on Minimum	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Dralnage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C
Depth (inches): Primarks: Primary Indicators (minimum of on Management Mater (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Dralnage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster of the control of the con
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Depth (inches): Permarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on Management Managem	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 4A, and 4B) Dralnage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster (C3)) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5)
Depth (inches): Permarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on Management Managem	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 4A, and 4B) Dralnage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Ca) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
Popth (inches): Proposition (A2) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial In Sparsely Vegetated Concave	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A) onagery (B7) Other (Explain in Remarks)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Capter of the content of the co
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Depth (inches): Permarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on Management Marks (Management Management Marks (Management Management Management (Management Management Mana	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A other (Explain in Remarks) Surface (B8) Depth (inches):	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Dralnage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Contest (C3)) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)
Popth (inches): Pararks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on Management Mater (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial In Sparsely Vegetated Concave Field Observations: Surface Water Present? Water Table Present? Yesturation Present? Yesturation Present?	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A Other (Explain in Remarks) Surface (B8) Depth (inches): Were Wer	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 24A, and 4B) Dralnage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster of the control of the cont
Popth (inches): Pararks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on Management Mater (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial In Sparsely Vegetated Concave Field Observations: Surface Water Present? Water Table Present? Yesturation Present? Yesturation Present?	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A other (Explain in Remarks) Surface (B8) Depth (inches):	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 4A, and 4B) Dralnage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster of the control of the cont
Popth (inches): Primarks: Primary Indicators (minimum of on Marks (Marks) Water Water (A1) High Water Table (A2) Saturation (A3) Water Marks (Marks (Marks) Sediment Deposits (Marks) Algal Mat or Crust (Marks) Iron Deposits (Marks) Surface Soil Cracks (Marks) Inundation Visible on Aerial In Sparsely Vegetated Concave Field Observations: Surface Water Present? Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A Other (Explain in Remarks) Surface (B8) Depth (inches): Were Wer	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Dralnage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Composition (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)
Popth (inches): Pararks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of on Management Mater (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial In Sparsely Vegetated Concave Field Observations: Surface Water Present? Water Table Present? Yesturation Present? Yesturation Present?	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Stunted or Stressed Plants (D1) (LRR A Other (Explain in Remarks) Surface (B8) Depth (inches): Were Wer	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 24A, and 4B) Dralnage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster of the control of the cont

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: 4071 CHCO u AY NW city/County: Bren	OPCION Sampling Date: 07.26.10
Applicant/Owner: Ch FUNE District	State: UA Sampling Point: Spory
Investigator(s): Rouers Rose Section, Township, Range	ge: 05-24-01E
	onvex, nane): NOVE Slope (%): 2-3
Λ ,	
	Long: Datum: NWI classification: VOO-6
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "N	lormal Circumstances" present? YesK No
Are Vegetation, Soil, or Hydrology naturally problematic? (If nee	ded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sampling point lo	cations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No No Is the Sampled	Araa
Hydric Soil Present?	V
vvetland Hydrology Present?	
The state of the s	eps. Area is steuble
with signs a historicusciman	uputions Surjace.
VEGETATION – Use scientific names of plants.	*
Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 1000) % Cover Species? Status	Number of Dominant Species That Are ORL EACING or EAC:
2 Ago Aloua 30 D FAC	That Are OBL, FACW, or FAC: (A)
3.	Total Number of Dominant Species Across All Strata: (B)
4	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet:
1.000014	Total % Cover of: Multiply by:
2 Hurec	OBL species x 1 =
3 Kool Elperborry 5 of Face	FACW species x 2 =
4. DOUIS CLUB 5 11 HC	FAC species 95 x3=
5.	FACU species QG x 4= 360
Herb Stratum (Plot size: 300)	UPL species x 5 =
1. Stinging nettle 10 11 fac	Column Totals: 190 (A) (B)
2. Lady ten	Prevalence Index = B/A = 3.5
3. Uputhon the 10 M FAC	Hydrophytic Vegetation Indicators:
4. Sword term 15 4 freu	1 - Rapid Test for Hydrophytic Vegetation
5. Pacific waterlead 30 40 FAC	2 - Dominance Test is >50%
6	3 - Prevalence Index is ≤3.0°
8.	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
9.	5 - Wetland Non-Vascular Plants
10.	Problematic Hydrophytic Vegetation ¹ (Explain)
11.	¹ Indicators of hydric soil and welland hydrology must
7 = Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:	
1	Hydrophytic
2	Vegetation Present? Yes No K
% Bare Ground in Herb Stratum = Total Cover	
Remarks:	L

1 4071 CHICO W	depth needed to document the indicator or confirm	Sampling Point: 4
		die apsende of indicators.
epth Matrix nobes) Color (moist) / %	Redox Features Color (moist) % Type¹ Loc²	, Texture Remarks
	7.	TOAM
19 10gr 119 11		W
	/	
	RM=Reduced Matrix, CS=Covered or Coated Sand Gra	
ydric Soil Indicators: (Applicable t	o all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
_ Histosol (A1)	Sandy Redox (S5)	2 cm Muck (A10)
_ Histic Epipedon (A2)	Stripped Matrix (S6)	Red Parent Material (TF2)
Black Histic (A3)	Loamy Mucky Mineral (F1) (except MLRA 1)	Very Shallow Dark Surface (TF12)
_ Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Other (Explain in Remarks)
_ Depleted Below Dark Surface (A1:	•	3
_ Thick Dark Surface (A12)	Redox Dark Surface (F6)	³ Indicators of hydrophytic vegetation and
_ Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7)	wetland hydrology must be present,
Sandy Gleyed Matrix (S4)	Redox Depressions (F8)	unless disturbed or problematic.
Restrictive Layer (if present):		
Restrictive Layer (if present):		Hydric Soil Present? Yes No
Restrictive Layer (if present): Type: Depth (inches):		Hydric Soil Present? Yes No
Restrictive Layer (if present): Type: Depth (inches):		Hydric Soll Present? Yes No K
Restrictive Layer (if present): Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicators:		
Restrictive Layer (if present): Type: Depth (inches): Remarks: YDROLOGY		Secondary Indicators (2 or more required)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicators:		
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Type:	quired; check all that apply) Water-Stained Leaves (B9) (except	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B)
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Pattems (B10)
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Cots (C3) Geomorphic Position (D2)
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 3 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Ca) ots (C3) Geomorphic Position (D2) Shallow Aquitard (D3)
rype:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 3 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster of Caster of C
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6) Stunted or Stressed Plants (D1) (LRR A)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (County) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
Type:	quired; check all that apply) — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) — Salt Crust (B11) — Aquatic Invertebrates (B13) — Hydrogen Sulfide Odor (C1) — Oxidized Rhizospheres along Living Roc — Presence of Reduced Iron (C4) — Recent Iron Reduction in Tilled Soils (C6) — Stunted or Stressed Plants (D1) (LRR A) ery (B7) — Other (Explain in Remarks)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Composition (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5)
Type:	quired; check all that apply) — Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) — Salt Crust (B11) — Aquatic Invertebrates (B13) — Hydrogen Sulfide Odor (C1) — Oxidized Rhizospheres along Living Roc — Presence of Reduced Iron (C4) — Recent Iron Reduction in Tilled Soils (C6) — Stunted or Stressed Plants (D1) (LRR A) ery (B7) — Other (Explain in Remarks)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (County) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6) Stunted or Stressed Plants (D1) (LRR A) ery (B7) Other (Explain in Remarks) face (B8)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (County) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
Restrictive Layer (if present): Type: Depth (inches): Remarks: YDROLOGY Netiand Hydrology Indicators: Primary Indicators (minimum of one re Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Field Observations: Surface Water Present? Yes	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6) Stunted or Stressed Plants (D1) (LRR A) ery (B7) Other (Explain in Remarks) face (B8)	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Control of the Control of the Co
Restrictive Layer (if present): Type: Depth (inches): Remarks: YDROLOGY Netland Hydrology Indicators: Primary Indicators (minimum of one re Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Field Observations: Surface Water Present? Water Table Present? Yes Water Table Present?	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6) Stunted or Stressed Plants (D1) (LRR A) ery (B7) Other (Explain in Remarks) face (B8) No Depth (inches):	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Pattems (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C3) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 2 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (County) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A)
Type:	quired; check all that apply) Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6) Stunted or Stressed Plants (D1) (LRR A) ery (B7) Other (Explain in Remarks) face (B8) No Depth (inches):	Secondary Indicators (2 or more required) Water-Stained Leaves (B9) (MLRA 1, 3 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (Caster (C3)) Geomorphic Position (D2) Shallow Aquitard (D3) FAC-Neutral Test (D5) Raised Ant Mounds (D6) (LRR A) Frost-Heave Hummocks (D7)

APPENDIX C WETLAND RATING FORM



RATING SUMMARY – Western Washington

ame of wetland (or ID #): 4071 CHICO WAY NW		Date of site visit:07.	.26.19	
Rated by RMYERS; BGE E	NVIRONME	Trained by Ecology? ☑ Yes ☐ No	Date of training 2	2017
HGM Class used for rating	Slope	Wetland has multip	le HGM classes? ☐ Yes [☑ No
	•	t the figures requested (figures can map KCGIS; BING; GOOGLE	be combined).	
			_	
OVERALL WETLAND CA	TEGORYIII_	(based on functions ☑ or specia	ll characteristics)	
1. Category of wetland		· ·		
	_Category I - Total so	core = 23 - 27	Score for each	
	Category II - Total s	score = 20 - 22	function based	
X	Category III - Total	score = 16 - 19	on three	
	Category IV - Total	score = 9 - 15	ratings	

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List app	ropriate rating	(H, M, L)	
Site Potential	M	L	М	
Landscape Potential	M	М	L	
Value	Н	L	М	Total
Score Based on Ratings	7	4	5	16

Score for each function based on three ratings (order of ratings is not important)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	Х

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (can be added to map of hydroperiods)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (can be added to another figure)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including	H 2.1, H 2.2, H 2.3	
polygons for accessible habitat and undisturbed habitat		
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	<u> </u>	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (can be added to another figure)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (can be added to another figure)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including	H 2.1, H 2.2, H 2.3	
polygons for accessible habitat and undisturbed habitat		
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

To answer questions:	Figure #
L 1.1, L 4.1, H 1.1, H 1.4	
L 1.2	
L 2.2	
H 2.1, H 2.2, H 2.3	
L 3.1, L 3.2	
L 3.3	
	L 1.1, L 4.1, H 1.1, H 1.4 L 1.2 L 2.2 H 2.1, H 2.2, H 2.3 L 3.1, L 3.2

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	1
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	1
Plant cover of dense, rigid trees, shrubs, and herbaceous plants	S 4.1	4
(can be added to another figure)		'
Boundary of area within 150 ft of the wetland (can be added to another figure)	S 2.1, S 5.1	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including	H 2.1, H 2.2, H 2.3	2
polygons for accessible habitat and undisturbed habitat		2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	3

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated. If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are th	ne water levels in the entire unit usual	ly controlled by tides e	except during floods?
V	NO - go to 2	☐ YES - the wetland	d class is Tidal Fringe - go to 1.1
1.1	Is the salinity of the water during per	iods of annual low flo	w below 0.5 ppt (parts per thousand)?
		a Freshwater Tidal Fri Estuarine wetland ai	YES - Freshwater Tidal Fringe inge use the forms for <i>Riverine</i> wetlands. Indies not scored. This method cannot be
	ntire wetland unit is flat and precipitati vater and surface water runoff are NO		
V	NO - go to 3 If your wetland can be classified as a		☐ YES - The wetland class is Flats he form for Depressional wetlands.
	the entire wetland unit meet all of the The vegetated part of the wetland is plants on the surface at any time of the At least 30% of the open water area	on the shores of a both the year) at least 20 a	
~	NO - go to 4	☐ YES - The wetlan	nd class is Lake Fringe (Lacustrine Fringe)
\ \?	the entire wetland unit meet all of the The wetland is on a slope (<i>slope car</i> The water flows through the wetland It may flow subsurface, as sheetflow The water leaves the wetland witho	n be very gradual), in one direction (unid r, or in a swale withou	
	NO - go to 5	E	☑ YES - The wetland class is Slope
	Surface water does not pond in these to ons or behind hummocks (depression		pt occasionally in very small and shallow ameter and less than 1 ft deep).
	the entire wetland unit meet all of the The unit is in a valley, or stream cha from that stream or river, The overbank flooding occurs at leas	nnel, where it gets inc	
✓	NO - go to 6		☐ YES - The wetland class is Riverine
NOTE: T	he Riverine unit can contain denressi	ons that are filled with	water when the river is not flooding

, • .	depression in which water ponds, or is saturated to the surface, at any outlet, if present, is higher than the interior of the wetland.
☑ NO - go to 7	☐ YES - The wetland class is Depressional
The unit does not pond surface water more	y flat area with no obvious depression and no overbank flooding? than a few inches. The unit seems to be maintained by high be ditched, but has no obvious natural outlet.
☑ NO - go to 8	☐ YES - The wetland class is Depressional
Vour wotland unit seems to be difficult to	classify and probably contains several different HGM classes. For

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit	HGM class to
being rated	use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream	Depressional
within boundary of depression	
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other	Treat as
class of freshwater wetland	ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.

SLOPE WETLANDS			
Water Quality Functions - Indicators that the site functions to im	prove water	quality	
S 1.0. Does the site have the potential to improve water quality?			
S 1.1. Characteristics of the average slope of the wetland: (a 1% slope has a 1 elevation for every 100 ft of horizontal distance)	ft vertical d	rop in	
Slope is 1% or less	po	ints = 3	4
Slope is > 1% - 2%	ро	ints = 2	1
Slope is > 2% - 5%	ро	ints = 1	
Slope is greater than 5%	ро	ints = 0	
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic			3
(use NRCS definitions):	Yes = 3	No = 0	3
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollu			
Choose the points appropriate for the description that best fits the plants in the			
means you have trouble seeing the soil surface (>75% cover), and uncut mean	s not graze	d or	
mowed and plants are higher than 6 in.		· a	
Dense, uncut, herbaceous plants > 90% of the wetland area	•	ints = 6	3
Dense, uncut, herbaceous plants > ½ of area	•	ints = 3	
Dense, woody, plants > ½ of area	•	ints = 2	
Dense, uncut, herbaceous plants > 1/4 of area		ints = 1	
Does not meet any of the criteria above for plants		ints = 0	
Total for S 1 Add the points	in the boxes	s above	7
			45 60 4
Rating of Site Potential If score is: 12 = H			the first page
Rating of Site Potential If score is: ☐ 12 = H ☐ 6 - 11 = M ☐ 0 - 5 = L S 2.0. Does the landscape have the potential to support the water quality functions.			the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in			
S 2.0. Does the landscape have the potential to support the water quality functi			the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in	on of the sit	te?	
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants?	on of the sit	te?	
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are	on of the sit	te? No = 0	1
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1?	Yes = 1	No = 0	1
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources	Yes = 1 Yes = 1 in the boxes	No = 0 No = 0 s above	1
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points	Yes = 1 Yes = 1 in the boxes Record the	No = 0 No = 0 s above	0
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is:	Yes = 1 Yes = 1 in the boxes Record the	No = 0 No = 0 s above	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: 1 - 2 = M 0 = L	Yes = 1 Yes = 1 in the boxes Record the	No = 0 No = 0 s above	0
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: ☑ 1 - 2 = M □ 0 = L S 3.0. Is the water quality improvement provided by the site valuable to society S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 Yes = 1 in the boxes Record the	No = 0 No = 0 s above rating on	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is:	Yes = 1 Yes = 1 in the boxes Record the	No = 0 No = 0 s above rating on	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: ☑ 1 - 2 = M □ 0 = L S 3.0. Is the water quality improvement provided by the site valuable to society S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list.	Yes = 1 Yes = 1 in the boxes Record the in the second the in the second the interest of the second the interest of the second the	No = 0 No = 0 s above rating on	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: ☑ 1 - 2 = M □ 0 = L S 3.0. Is the water quality improvement provided by the site valuable to society S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue?	Yes = 1 Yes = 1 in the boxes Record the in the second the in the second the interest of the second the interest of the second the	No = 0 No = 0 s above rating on	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality functions 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: ☑ 1 - 2 = M □ 0 = L S 3.0. Is the water quality improvement provided by the site valuable to society S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list. S 3.3. Has the site been identified in a watershed or local plan as important for	Yes = 1 Yes = 1 in the boxes Record the in the second the in the second the interest of the second the interest of the second the	No = 0 No = 0 s above rating on	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality function S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: ☑ 1 - 2 = M □ 0 = L S 3.0. Is the water quality improvement provided by the site valuable to society S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list. S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? Answer YES if there is a TMDL for the basin in	Yes = 1 Yes = 1 in the boxes Record the Yes = 1 Yes = 1 Yes = 1	No = 0 No = 0 s above rating on No = 0 No = 0	1 0 1 the first page
S 2.0. Does the landscape have the potential to support the water quality functions 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Total for S 2 Add the points Rating of Landscape Potential If score is: ☑ 1 - 2 = M □ 0 = L S 3.0. Is the water quality improvement provided by the site valuable to society S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list. S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? Answer YES if there is a TMDL for the basin in which the unit is found?	Yes = 1 Yes = 1 in the boxes Record the Yes = 1 Yes = 1 Yes = 2 in the boxes	No = 0 No = 0 s above rating on No = 0 No = 0 No = 0 s above	1 0 1 the first page 1 1 2

SLOPE WETLANDS Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion	
S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose	
the points appropriate for the description that best fits conditions in the wetland. Stems of plants	
should be thick enough (usually > $^{1}/_{8}$ in), or dense enough, to remain erect during surface flows.	
Dense, uncut, rigid plants cover > 90% of the area of the wetland points ≈ 1	
All other conditions points = 0	
Rating of Site Potential If score is: \Box 1 = M \Box 0 = L Record the rating on the first	page
S 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land	
uses or cover that generate excess surface runoff? Yes = 1 No = 0	
Rating of Landscape Potential If score is: 1 = M 0 = L Record the rating on the first	page
S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems:	
The sub-basin immediately down-gradient of site has flooding	
problems that result in damage to human or natural resources (e.g.,	
houses or salmon redds) points = 2	
Surface flooding problems are in a sub-basin farther down-gradient points = 1	
No flooding problems anywhere downstream points = 0	
S 6.2. Has the site been identified as important for flood storage or flood	
conveyance in a regional flood control plan? Yes = 2 No = 0	
Total for S 6 Add the points in the boxes above 0	
Rating of Value If score is: 2 - 4 = H 1 = M 0 = L Record the rating on the first	2000

NOTES and FIELD OBSERVATIONS:

These questions apply to wetlands of all HGM classes.				
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat				
H 1.0. Does the site have the potential to provide habitat?				
H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.				
 □ Aquatic bed □ Emergent □ Scrub-shrub (areas where shrubs have > 30% cover) □ Forested (areas where trees have > 30% cover) □ If the unit has a Forested class, check if: □ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon 	2			
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (see text for descriptions of hydroperiods).				
 ✓ Permanently flooded or inundated ✓ Seasonally flooded or inundated ✓ Occasionally flooded or inundated ✓ Saturated only ✓ Permanently flowing stream or river in, or adjacent to, the wetland 	3			
 □ Seasonally flowing stream in, or adjacent to, the wetland □ Lake Fringe wetland □ Freshwater tidal wetland 2 points 2 points 				
H 1.3. Richness of plant species				
Count the number of plant species in the wetland that cover at least 10 ft ² . Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple				
loosestrife, Canadian thistle	2			
If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species				
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. If you have four or more plant classes or three classes and open water, the rating is always high.				
None = 0 points Low = 1 point Moderate = 2 points				
All three diagrams in this row are HIGH = 3 points				

H 1.5. Special habitat features:				
Check the habitat features that are present in the wetland. The number of checks is the number				
of points.				
☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long)				
☑ Standing snags (dbh > 4 in) within the wetland				
☑ Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends				
at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at				
least 33 ft (10 m)	4			
Stable steep banks of fine material that might be used by beaver or muskrat for denning	7			
(> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees</i>				
that have not yet weathered where wood is exposed)				
☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas				
that are permanently or seasonally inundated (structures for egg-laying by amphibians)				
✓ Invasive plants cover less than 25% of the wetland area in every stratum of plants (see				
H 1.1 for list of strata)				
	40			
Total for H 1 Add the points in the boxes above	13			
Rating of Site Potential If Score is: 15 - 18 = H 7 - 14 = M 5 0 - 6 = L Record the rating on	tne tirst page			
H 2.0. Does the landscape have the potential to support the habitat function of the site?				
H 2.1 Accessible habitat (include only habitat that directly abuts wetland unit).				
Calculate:				
0 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0%				
If total accessible habitat is:	0			
$> \frac{1}{3}$ (33.3%) of 1 km Polygon points = 3				
20 - 33% of 1 km Polygon points = 2				
10 - 19% of 1 km Polygon points = 1				
< 10 % of 1 km Polygon points = 0				
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.				
Calculate:				
20 % undisturbed habitat + (% moderate & low intensity land uses / 2) = 30%				
Lindinturk ad high total SOO/ of Delumen	1			
Undisturbed habitat > 50% of Polygon points = 3				
Undisturbed habitat 10 - 50% and in 1-3 patches points = 2				
Undisturbed habitat 10 - 50% and > 3 patches points = 1				
Undisturbed habitat < 10% of 1 km Polygon points = 0				
H 2.3 Land use intensity in 1 km Polygon: If				
> 50% of 1 km Polygon is high intensity land use points = (-2)	-2			
≤ 50% of 1km Polygon is high intensity points = 0				
Total for H 2 Add the points in the boxes above	-1			
Rating of Landscape Potential If Score is: 4-6=H 1-3=M <	the first page			
H 3.0. Is the habitat provided by the site valuable to society?				
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? <i>Choose</i>				
only the highest score that applies to the wetland being rated				
Site meets ANY of the following criteria: points = 2				
☐ It has 3 or more priority habitats within 100 m (see next page)				
☐ It provides habitat for Threatened or Endangered species (any plant				
or animal on the state or federal lists)				
☐ It is mapped as a location for an individual WDFW priority species	1			
☐ It is a Wetland of High Conservation Value as determined by the				
Department of Natural Resources				
☐ It has been categorized as an important habitat site in a local or	l			
regional comprehensive plan, in a Shoreline Master Plan, or in a				
watershed plan	l			
Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1				
Site does not meet any of the criteria above points = 0				
Rating of Value If Score is: 2 = H 1 = M 0 = L Record the rating on	the first page			

Wetland Rating System for Western WA: 2014 Update Rating Form - Effective January 1, 2015

WDFW Priority Habitats

<u>Priority habitats listed by WDFW</u> (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List, Olympia, Washington. 177 pp.

http://wdfw.wa.gov/publications/00165/wdfw00165.pdf_or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: NOTE: This question is independent of the land use between the wetland unit and the priority habitat. Aspen Stands: Pure or mixed stands of aspen greater than 1 ac (0.4 ha). Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (full descriptions in WDFW PHS report). Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock. ☐ Old-growth/Mature forests: Old-growth west of Cascade crest - Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests - Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 vears old west of the Cascade crest. Oregon White Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full descriptions in WDFW PHS report p. 158 - see web link above). Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (full descriptions in WDFW PHS report p. 161 - see web link above). ☑ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (full descriptions of habitats and the definition of relatively undisturbed are in WDFW report - see web link on previous page). Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. Cliffs: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation. Talus: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland	Туре	Category					
	any criteria that apply to the wetland. List the category when the appropriate criteria are met.						
SC 1.0. I	Estuarine Wetlands						
	Does the wetland meet the following criteria for Estuarine wetlands?						
	Vegetated, and						
	With a salinity greater than 0.5 ppt ☐ Yes - Go to SC 1.1 ☐ No = Not an estuarine wetland						
SC 1.1.	☐ Yes - Go to SC 1.1 ☐ No = Not an estuarine wetland Is the wetland within a National Wildlife Refuge, National Park, National Estuary						
SC 1.1.	Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific						
	Reserve designated under WAC 332-30-151?						
	☐ Yes = Category I ☐ No - Go to SC 1.2						
SC 1.2.	Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?						
OO 1.2.	The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing,						
_	and has less than 10% cover of non-native plant species. (If non-native species are						
	Spartina, see page 25)						
	At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-						
	grazed or un-mowed grassland.						
	The wetland has at least two of the following features: tidal channels, depressions with						
	open water, or contiguous freshwater wetlands.						
	☐ Yes = Category I ☐ No = Category II						
SC 2.0. \	Netlands of High Conservation Value (WHCV)						
SC 2.1.	Has the WA Department of Natural Resources updated their website to include the list						
	of Wetlands of High Conservation Value?						
	☐ Yes - Go to SC 2.2 ☐ No - Go to SC 2.3						
SC 2.2.	Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?						
	☐ Yes = Category I ☐ No = Not WHCV						
SC 2.3.	Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?						
	http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf						
	☐ Yes - Contact WNHP/WDNR and to SC 2.4 ☐ No = Not WHCV						
SC 2.4.	Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation						
	Value and listed it on their website?						
6630	☐ Yes = Category I ☐ No = Not WHCV						
SC 3.0. E	Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation						
	in bogs? Use the key below. If you answer YES you will still need to rate the						
	wetland based on its functions .						
SC 3.1.	Does an area within the wetland unit have organic soil horizons, either peats or mucks,						
00 0.1.	that compose 16 in or more of the first 32 in of the soil profile?						
	☐ Yes - Go to SC 3.3 ☐ No - Go to SC 3.2						
SC 3.2.	Does an area within the wetland unit have organic soils, either peats or mucks, that are						
	less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic						
	ash, or that are floating on top of a lake or pond?						
	☐ Yes - Go to SC 3.3 ☐ No = Is not a bog						
SC 3.3.	Does an area with peats or mucks have more than 70% cover of mosses at ground						
	level, AND at least a 30% cover of plant species listed in Table 4?						
	☐ Yes = Is a Category I bog ☐ No - Go to SC 3.4						
	NOTE: If you are uncertain about the extent of mosses in the understory, you may						
	substitute that criterion by measuring the pH of the water that seeps into a hole dug at						
	least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present,						
	the wetland is a bog.						
SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir,							
	western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann						
	spruce, or western white pine, AND any of the species (or combination of species) listed						
	in Table 4 provide more than 30% of the cover under the canopy?						
	☐ Yes = Is a Category I bog ☐ No = Is not a bog						

SC 4.0.	Forested Wetlands						
	Does the wetland have at least 1 contiguous acre of forest that meets one of these						
	criteria for the WA Department of Fish and Wildlife's forests as priority habitats? If you						
	answer YES you will still need to rate the wetland based on its functions.						
	Old-growth forests (west of Cascade crest): Stands of at least two tree species,						
	forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac						
	(20 trees/ha) that are at least 200 years of age OR have a diameter at breast height						
	(dbh) of 32 in (81 cm) or more.						
	Mature forests (west of the Cascade Crest): Stands where the largest trees are 80-						
	200 years old OR the species that make up the canopy have an average diameter (dbh)						
	exceeding 21 in (53 cm).						
	exceeding 27 in (ee cin).						
	□ Voc = Cotogony I □ No = Not a forested wetland for this continu						
00.50	☐ Yes = Category I ☐ No = Not a forested wetland for this section						
SC 5.0.	Wetlands in Coastal Lagoons						
	Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?						
	The wetland lies in a depression adjacent to marine waters that is wholly or partially						
	separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently,						
	rocks						
	The lagoon in which the wetland is located contains ponded water that is saline or						
	brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (needs to						
	be measured near the bottom)						
	☐ Yes - Go to SC 5.1 ☐ No = Not a wetland in a coastal lagoon						
9C E 1							
_	Does the wetland meet all of the following three conditions?						
	The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing),						
	and has less than 20% cover of aggressive, opportunistic plant species (see list of						
	species on p. 100).						
	At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-						
	grazed or un-mowed grassland.						
	The wetland is larger than $^{1}/_{10}$ ac (4350 ft ²)						
	☐ Yes = Category I ☐ No = Category II						
SC 6.0.	Interdunal Wetlands						
	Is the wetland west of the 1889 line (also called the Western Boundary of Upland						
	Ownership or WBUO)? If you answer yes you will still need to rate the wetland						
	based on its habitat functions.						
	In practical terms that means the following geographic areas:						
		1					
	Long Beach Peninsula: Lands west of SR 103						
	Grayland-Westport: Lands west of SR 105						
	Ocean Shores-Copalis: Lands west of SR 115 and SR 109						
	☐ Yes - Go to SC 6.1 ☐ No = Not an interdunal wetland for rating						
SC 6.1.	Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form						
	(rates H,H,H or H,H,M for the three aspects of function)?						
	☐ Yes = Category I ☐ No - Go to SC 6.2						
SC 6.2.	Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?						
	☐ Yes = Category II ☐ No - Go to SC 6.3						
SC 6.3.							
	1 ac?						
Cata	100 Outogot 111 110 Outogot 11						
_	y of wetland based on Special Characteristics						
If you an	swered No for all types, enter "Not Applicable" on Summary Form	ı I					



FORESTED SCRUB/SHRUB

EMERGENT SATURATED SEASONALLY FLOODED OR INUNDATED PERMANENTLY FLOWING PERMANENTLY FLOODED

FOR RATING PURPOSES ONLY

BGE19_0720

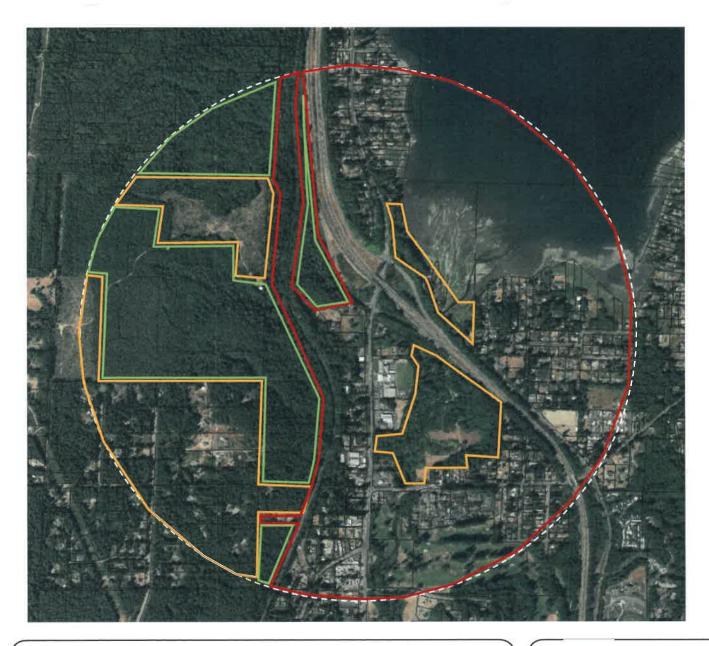
FIGURE 1 HI.I, HI.4, HI.2, SI.3, 54.1, 52.1, 55.1,

FIRE DISTRICT 4071 CHICO WAY NW 052401-2-029-2005



BGE Environmental, LLC

Wetland Consulting & Land Use Planning



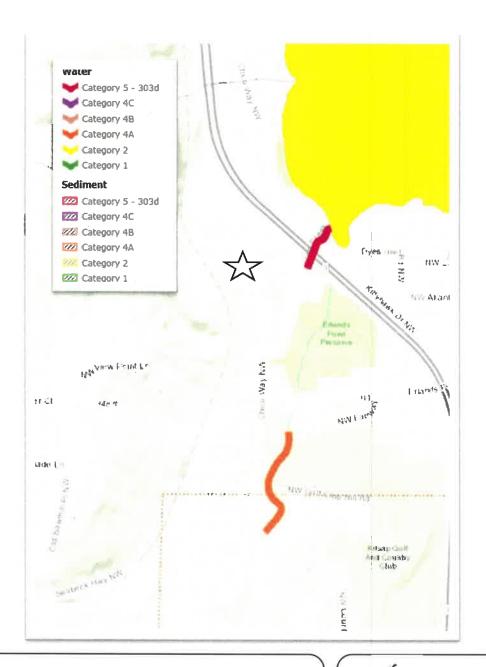
FOR RATING PURPOSES ONLY BGE19_0720

FIGURE 2 H2.1, H2.2, H2.3 FIRE DISTRICT 4071 CHICO WAY NW 052401-2-029-2005



BGE Environmental, LLC

Wetland Consulting & Land Use Planning



FOR RATING PURPOSES ONLY BGE19_0720

FIGURE 3 53.1, 53.2, 53.3

FIRE DISTRICT 4071 CHICO WAY NW 052401-2-029-2005



BGE Environmental, LLC

Wetland Consulting & Land Use Planning



Wetland Consulting and Land Use Planning

2102 Brashem Ave Bremerton, WA 98310 (360) 710-6066 www.bgeenvironmental.com

GENERAL NOTES

- All worksamely and seterial shall conform to the NOST CURRENT Standard Specification for Road Oridge and Nuncipal Construction prepared by WSDOT and APWA as adopted by the Niteap County Department of Public Works (NCDPW).
- Any revisions to the accepted construction plans shall be revisined and approved by the NCOPW prior to suplementation in the field.
- The contractor shall maintain a set of the accepted construction drawings on-situ at all times while construction is in progress.
- it shall be the responsibility of the contractor to obtain al necessary permits from the KCDPW prior to commencing any work within County right-of-way.
- The contractor shall be responsible for providing adequate traffic control at all times during construction adequate or with all public readways. Fraffic flow on codeting public readways whall be assistanced at all times, which as peralesion is obtained from the KCDPW for road closure and/or obstants.
- The locations of salating utilities on this plan is approximate only. The contractor shall contract the "Underground Locatin Contract if he "1-800-429" ±5555, and somewhatering histological shall be provided for production of one consequence of one consequence of one consequence of one contractor and provide for production of existing stitutes from damage caused by the contractor of specialism.
- Rockeries or other retaining facilities exceeding 4 ft. in height require a separate persit from the Ritsep County Duiding Department.
- A "Forestry Fractices" persit way be required prior to clearing of this sits. Contact the Nitsep County Department of Community Development for further of ornation.

GRADING NOTES

- The contractor shall notify the engineer in the event or discovery of poor sols, groundwater or discrepancies in the existing conditions as noted as the plans.
- Lises otherwise specified, all cabenhearts in the Pan Set shall be constructed in accordance with Section 2-03.3014/30 of the WEXPOT Standard Specifications Exhaultent compections shall coordina to Section 2-03.3014/30, Nethod B of said Standard Specifications.
- Estembents designed to imposed water shall be compected to 95% medical dessity per section 2-03.3CHAS. Nathod C of WSDOT Steaderd Specifications.
- 5. All mean reaching I'll embertel shall be propored by removing visignitation accomplying I'll, topsed and other neutritate material by according to the various to provide a bond with the service I'll and since shope are stopped than 3 horacontal to 1 vertical and the height is greater than 5 Pt. by beaching lato sound completant setteral is of otherwised by a noise angleser.

DRAINAGE NOTES

- The contractor shall easure that the drollege is installed and operational prior to commercement of paying work.
- All steel pipe and parts shall be galvanted. All subsamped steel pipes shall be galvanted and hore aspiralt treatment # 1 or better.

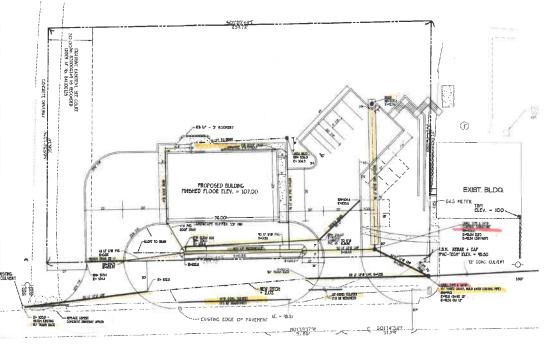
CONSTRUCTION SEQUENCE

- Apply for and pick up any required road approach or right of way permits from Notsep County Department of Public Works.
- 2. Construct stablized construction entravers)
- 3. Construct filter feace berriers.
- 4. Construct sedimentation basins.
- 5. Construct ratoff interception and diversion ditches.
- Clear and gracic the abilities site area required for construction of the vertices
 phones of work.
- Hantan all arosion and sedecatation control facities to provide the required protection of downstream enter quarty.
- 4. Provide permonent site stabilization.
- Erosion and seclmentation control facilities shall not be removed until construction is complete and accepted by Kitesp Gounty.

STATION NO. 64

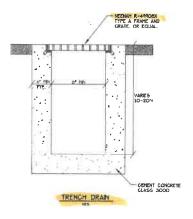
A PORTION OF SECTION 5, TOWNSHIP 24 NORTH, RANGE 1 EAST, W.M. KITSAP COUNTY, WASHINGTON STORM DRAINAGE PLAN

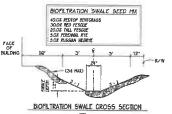




STORM DRAINAGE CONSTRUCTION NOTES:

- 2. REFOR TO SECTION 9-03.16 DEDDING NATERAL FOR FLEDIBLE PPP* FOR BEDDING OF 12* ADS H-12 AND G* PYC SOR-35 STORM PPES.
- 3, REFER TO SECTION 4-03.15 BEDOING MATERIALS FOR RIGID PIPE" FOR BEDDING OF ALL CHE
- REFER TO SECTION 7-05.3 "CONSTRUCTION REQUIREMENTS FOR CONSTRUCTION OF MANHOLES AND CATCH BASHO".
- 5. REFER TO SECTION 7-02.5(1) "PLACING CULVERT PPE GENERAL" FOR INSTALLATION OF STORM
- G. REFER TO SECTION 4-05 'DRANAGE STRUCTURES, CULVERTS, AND CONDUTS' FOR MATERIAL
- 7. THE STORM DETENTION PIPE SHALL BE CONTECH ALLMINIZED STEEL TYPE-2, GAGE 14 OR
- 3. REFER TO WISDOT STANDARD PLANS BZA AND BZB FOR FRAME AND GRATE.
- 9. REFER TO WEDOT STANDARD PLAN 8-201 FOR AREA INLET DETAILS.





FAGE	20.0x	TALL FESQUE PERENNAL RYE RUSSIAN HEDRYE		
BULDING	16'	3′ €	3′	12.
	B.	C34 HAD 1	<u>.</u>	11.3
	SWALE SEPTIM		3	197
	BIOST TRA	TON CHAIR	00000	rameu
	DOFILIKA	TION SWALE	UKO55 :	SECTION

DESIGNED BY CTB			
SHIP ST BMA	-		
CHECKED BY			
SEC 5 TWN 24N R 1E		BID SET	7.21.18
SCALE 1990	PFV	DESCRIPTION	CUTE

STATION NO. 64 STORM DRAMAGE PLAN

EXPROS 4/4/79

K.C. FIRE PROTECTION DISTRICT #12 407 CHICO WAY HW

WestSound Engineering

217 5.W. Wilklas Drive Part Orchard, Wa. 98366 Phone (360) 876-3770 Fax (360) 876-0439

700 SHTC 207 5 SHTS

INSPECTION SCHEDULE

- The contractor shall notify Nilsep Coasty Mobile Works Department. Construction Division to errorge for impaction of the various pheses of work obscised below. All impactions what he completed prior to proceeding with the sext phase of work.
- A instantian of the stantiand construction entrance.

 5. Appendixture of the urnew poses of the freeze and Seatherstation Central Plan.

 5. Regionated of diverges structure price to local flags, technique post of structure.

 6. Regionated of diverges structure price to local flags, technique post entertained.

 6. Inspection of prompt dependence of processes.

 6. Sepection of free gradup prior to people.

 8. Respective of granting perfections.

 8. Respective of granting perfections.

- The Contractor shall be responsible for all work performed and shall ensure that construction is acceptable to Nitsep Committy.
- 3. If hapacities is not called for prior to completion of may item of work so designated, special destruction mat/or so-destructive instain procedures may be required to make the exceptibility of the work. If such procedures are required, the Contractor stat he responsible for all costs associated with the beauting and/or restauration of the sort.

MINIMUM EROSION AND SEDMENTATION CONTROL REQUIREMENTS

- Stabilization and Address traceres. All exposed and amended sole lockules and securities and sec
- At all times of the year, the contractor shall have sofficient materials, equipment and labor on-side to stability and provent enoise from all densited erces within 12-hours as side and weather constitute dictate.

From October 1st to April 2016, the Project Engineer shell what the development sits a shawn of once per seld. For the propose of Important the crosses and sedementation of the Project of Important the crosses and sedementation of the provision of the provision control seasons being discretization. The Project Engineer shall insolublely sifters the Director of any proteines or potential professes observed during selds seek the provision of the

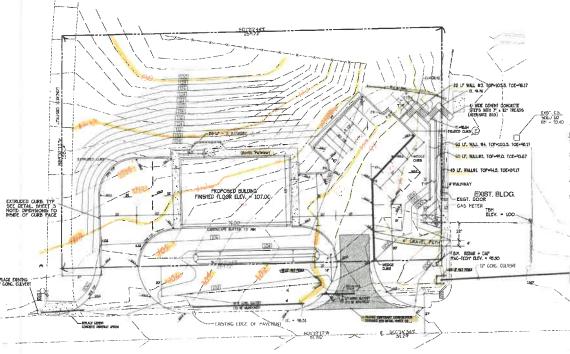
is the event that ground on a project site is lift bare after September 30th, the Coasty may have a Step Work Order for the extra project until methinatury controls ore provided. In addition, the control will be shiped to the permitties provided in Section 10 and 11 of the Nitaep County Stormenter Ordenics.

- In the creat that ground on a project site is left here September 30th and the County is sweecessful to contacting the Owner or in-free designated coargeory contact person. The County may mitter the project site and estable separary ground cover sensors and this County for all expenses secred by the County. These costs will be a modificate to any memorary prostate before against the Owner for all expenses secred by the County.
- 2. <u>Debestion of clears and seasons letts.</u> Clearing late, setbecks, buffers, and sensitive or critical proces such as steep slopes, verticals and riperion corridors shall be clearly sarked in the field and imprected by Wisson County Department of Community development prior to commencement of land clearing activities.
- Protection of selected properties. Adjacent properties shall be protected from sediment deposition by appropriate use of vegetatine buffer steps, sediment benears or fitters, dates or military, or by a confination of these measures and other appropriate biffs.
- 4. Inside and abditionation of sections, imposer as . Sectionart peach and traps, parameter dilets anotherns thereins and other fifth introded to trap sectionate or and shall be constructed as a first stop in grading. These Piffs with the fractional before land disturbing architects than place. Earthus structures such as dema class, and diversions shall be at inflation and produced to the company to the traps placetar of the control o
- 5. Spot Statistication. Out and fill slopes shall be constructed in a senser that vil assess around. Suspiness and surfaces, was preferred to escoth surfaces. In the region of surface places with here. In the region of surface places with here. In all the region of surfaces are surfaced to first down to first out of surfaces. It is suffered to first down to first out of our first first out of the region of surfaces are suffaced to first own proper slope suffaces. Wherever a slope first corrustes a writer scopings place, adopted and the products should be provided. In addition, slopes should be suffaced in succession with that Out down.
- 6. <u>Controlles off-site erosion</u>. Properties and veterways downstreen from development situs yield be producted from erosion due to increase in the volume, velocity, and peak flow rote of stomwenter morif from the development site by the implementation of appropriate lift's to minimize advirace downstream impacts.
- 7. Studiescites of Leapoury consumes channels and outlish. All temporary of-extra convergence channels and the changed, construction and industrial to present strained for the past-industrial temporary consumers. As the consumer consumer consumers of court in a city case thereas a some consumers of courts of a compresse systems.
- 8. Storm drink help protection. All storm drink helps made operable caring committees all the protection to their stormwister read? Held not take the conceptuoe system without first bown filtered or otherwise structed for some seadent. After any every writtee application, the regimerant for help relaction may be written by the first care and the system downstroom of the first design as the spurit, based with the unaniprous system downstroom of the first designing to our operations obtained continuent fifth and the consignate system can be observed to design designation of the first design of the state of t
- q <u>laborarous utilizar construction</u>, the construction of enderground utility bessired be latited visure feasible. In so some than 2007 feet of open trouch cit any committee of the construction of the construction of the construction of the print side of the trunch. Describing divinces and elacharge to an appropriate addition, trap or posal praceded by adequate sterry desiphion, prior to more! Unweight be also.
- 10. <u>Constructed necess reades.</u> Wherever construction vehicle necess reades bitereset pereir coath, provisions such be made to minima the transport of subsect Goard not prepared not by such of symptomic BRFT such as a listeriated Construction Distrace. If suchmet to transported ords a read surface, the crode size is to describe the transported from roads by select their properties or sectingly, so a minute of the code of such day, Souther their be readed from roads by selecting or sectingly and to transported to a controlled veillame, depose area. Street wasting shall be should up that suchmet it manned to the same.
- 11. Removed of Liespowery (RPS). All temporary crokin and sodheet control 6PTs had be responded WIDE 305 days effor filed but statistication is activated or effor that Leapnerry DRF or so changer benefort. Province statistics and by a leavest or extracted controls. Databased controls are the statistical controls and the statistic control of the statistic control of the statistic control 6PTs any soil be required for those projects, such as high rating short, but that the foldowed by additional controls one of officers pents, by these connectations, the first fire recovering or returning the conserves will be orelated on a site-reportable control.
- 13. Costrol of politisets other bien sediment on construction sites. All politisets other than sediment that occur on-site during construction shall be braded and legally deposed of in a sensor that does not cause contamination of atoms on uniface values. Politicate of concernicable, but are not instead to finish. Extraction, solvents, concerds 5--products and construction.
- 14. <u>Methicopoc.</u> All temporary and personnel erosion and sediment control BMPs shall be methidated and required as needed to asserse continued performance of their intended function. All assistances and respect shall be connected in accordance at this terminar. The appetunit with the responsible for instantion that you shall resulting a summer of the responsible for instantion that you shall resulting a summer of the responsibility of the respective for instantion of the resulting and the

STATION NO. 64

A PORTION OF SECTION 5, TOWNSHIP 24 NORTH, RANGE 1 EAST, W.M. KITSAP COUNTY, WASHINGTON

GRADING + TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN



TO IMAKE

GENERAL EROSION AND SEDIMENTATION CONTROL NOTES

The following erosion and sedimentation control notes apply to all constriction site activities at all thes, where otherwise specified on these plans?

- Approval of this erosion and sedimentation control plan does not constitute as acceptance of the personnel road or drainings design.
- 2. The owner and this/her contractor shall be responsible at all these for preventing stillades resuff from declaraging from the project site. Fakes by the owner medicontractor can reach in a fine. The designated sengerary contacts person notated on the pin must be enabled for contact by telephone on a 2d form base throughout construction and will this project has been completed and excepted by the Contry.
- 3. The implementation of these ESC plans and the combination unitarience, replacement and spyroding of these facilities is the responsibility of the owner and/or contractor from the beginning of construction until all construction is completed and eccepted by the Comby and the after is statistical.
- Prior to begining any work on the project site. a preconstruction conference man hade and shall be attended by the general contractor, the project engineer, representatives from affected utilities, and a representative of Nitsep County.
- 5. The entroise and endountables coultre fractions done in the year of the consistent adequate here requirements for the miscrate adequate here requirements for the miscrate with conditions. During constructions, devided from the pile and pile miscrate in fact to make the very quality. Piler departures from the pile are powrated subject to the approved of the Coulty superfor. However, except for emanging, visitions, all other devided from the jam must be designed by the project engineer and approved by Ricago Court to the Adel State Court of the Court State Cour
- 5. All anoses and sedimentation control seasones shall be inspected by the owner and/or contractor on a frequent basis and smoothety of for each rainfall, and seasoned as necessary to laura table contract functioning. As ediment must be recoved from sit flaces, after beings, seclaim, posits after, prior to the sediment reaching 1/2.
- At so time shall concrete, concrete by-products, webtile flads, paint, chemicals, or other poliuting matter be permitted to decharge to the temporary or permanent drainage system, or to discharge from the project atte.
- Personent detention/retention poids, pipes, tanks or vasits may only be used for sediment containment when specifically indicated on these plans.

TEMPORARY EROSION AND SEDIMENTATION CONTROL MAINTENANCE REQUIREMENTS

- Enceton and sedmentation control facilities shall be inspected often each related event and daty during prolonged related.
- 2. Necessary repairs or replacement of facilities shall be accomplished promptly
- Sectment deposits shall be removed after each storm event or sites the level of deposition reaches approximately one-telf the maximum potential depth.
- Sections: deposits remaining in place ofter the ESC facilities are no longer required shall be dressed to conform to the additing grade, prepared and seeded
- Temporary Erosios and Sedmentation Control facilities shall

©TB BAC SEC 5 TWN 24R R 1E PUD 587 7.21.98 ENDOUGH 4/4/17 DESCRIPTION DATE BY DATE SEASO 3/87/16

STATION NO. 64 GRADING + TENPORARY EROSION AND SEDMENTATION CONTROL FLAN

K.G. FIRE PROTECTION DISTRICT #12 407 CHICO WAY NV

WestSound Engineering

217 S.W. Wikins Drive Port Orchard, We. 98366 Phons (360) 876-3770 Fax (360) 876-0439

700 917**C4**07 5 9175

TOPOGRAPHIC SURVEY CKFR STATION 64 AND CENTRAL SUPPLY JUNE 15, 2019 CKFR-64 CENTRAL SUPPLY CKFR-64 OB FINANCE CHICO WAY NW Engineering, Inc. gineering & Lond Surveying by NF New (360) 386-2124 subspine 88,855 Fee (503) 286-2124 CURB EDGE OF PAVEMENT EDGE OF PAVEMENT FENCE SANITARY SEWER LINE STORM MANHOLE D CATCH BASIN WATER LINE WETER WETER TOPMER LINE OF COMMENT TO POWER POLE FOILIND MONIMENT AS NO FOUND MONUMENT AS NOTED SIGN LIGHT POLE

CENTRAL KITSAP FIRE AND RESCUE MULTI-STATION SEISMIC ASSESSMENTS

ASCE 41-17 Tier 1 Seismic Evaluations

July 2019

Prepared for:

Rice Fergus Miller Architecture



Prepared by:

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728 134th Street SW, Suite 200 Everett, WA 98204 425-741-3800 File No. 262019.052

1.0 Executive Summary

Seismic screenings and structural evaluations were performed for eight Central Kitsap Fire and Rescue fire facility buildings to investigate seismic deficiencies. All buildings evaluated in this study are low-rise structures and include seven fire stations and one support facility. Each building is considered critical to the City's ability to provide post-earthquake emergency services.

The evaluations determined each building's expected structural performance for an Immediate Occupancy performance objective. After a seismic event, buildings that meet an Immediate Occupancy performance objective are expected to be structurally functional but may experience some damage to architectural finishes, mechanical systems, electrical systems, and other nonstructural items. This report includes a description of each building, the identified seismic deficiencies, seismic-upgrade concept designs for four of the active stations, and recommendations. All the buildings were found to have seismic deficiencies and do not meet the Immediate Occupancy performance objective.

Concept-level seismic upgrade designs were completed for four of the stations and concept plans are provided describing options for mitigation of seismic deficiencies. Recommendations consist of strengthening and supplementing the existing lateral systems, improving lateral load paths, and improving connections. Additional factors such as operational use, functionality, response times, and historic value should also be considered in the decision-making process for these buildings.

3.8 Fire Station 64

3.8.1 Building Description

Year Built:

1999

Number of Stories:

Floor Area:

5,400 SF

Address:

4065 Chico Way,

Bremerton, WA



Fire Station 64, known as the Chico Community Fire Station, is a two-story wood and steel framed structure. The 1999 building is rectangular in plan at the first floor at 48 feet by 76 feet. The second floor of the building is primarily located on the west side with a small section also located at the center of the building; a small mezzanine is located between the two floors. Fire Station 64 houses one engine, one rescue vehicle, and one tender.



Figure 3.8-1. Fire Station 64, Southeast Exterior.



Figure 3.8-2. Fire Station 64, Northwest Exterior.

Structural System

Table 3.8-1. Structural System Description of Fire Station 64.

Structural System	Description
Roof	The roof framing over the apparatus bay consists of steel beams with wood joists and is over-framed with wood trusses. The roof system over the second-floor consists of wood trusses with plywood sheathing.
Floor	The reinforced concrete slab on grade floor is a 7-1/2 inches thick, with trench drains in the apparatus bay. The second floor consists of wood joists with plywood sheathing and discrete steel beams.
Foundations	The wood-framed walls are supported by continuous concrete spread footings. Moment frames are supported on concrete frame beams along the entire south and north elevations. Interior columns are supported by individual concrete spread footings.
Hose Tower	N/A.
Lateral System	Wood-framed shear walls provide lateral support in both the transverse and longitudinal directions at the second floor. At the first floor, lateral resistance is provided at the exterior walls by wood shear walls in the longitudinal direction and steel moment frames in the transverse direction.

3.8.2 Seismic Evaluation Findings

Seismic Deficiencies

The seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 3.8-2. Identified Seismic Deficiencies for Fire Station 64.

Deficiency	Description
Vertical Irregularities	The second-floor walls are not continuous to the foundation, creating a gap in the load path. Vertical irregularities can cause excessive force in elements and overturning in columns.
Narrow Wood Shear Walls	Walls on the second floor have aspect ratios exceeding 1.5-to-1. Walls with large aspect ratios are likely to be highly stressed and subject to severe deformations that reduce capacity.

Walls Connected Through Floors Record drawings do not provide details for the connection of walls between floors. It is anticipated that there is no strapping between walls of different levels. Strapping is required to ensure the transfer of shear and overturning forces between shear walls of different levels.

Diaphragm Discontinuity

Lower and upper roof diaphragms are separated by a joint. Discontinuity in diaphragms may cause one or both to act as a cantilevered diaphragm, increasing lateral deflection.

Diagonally Sheathed and Unblocked Diaphragms Record drawings indicated that blocking is not typical at the diaphragms. Unblocked diaphragms are prone to premature failure due to joist rolling, especially when spans exceed the recommended length of 30 feet.

Flexural Stress Check

The calculated flexural stress was $1.41F_y$ in the column and $0.96F_y$ in the beam. Flexural stress in the column exceeds the maximum of F_y .

Moment-Resisting Connections

The flange plate in the moment-resisting connection is overstressed in tension by approximately 42%. The bolts connecting the flange plate to the beam are overstressed by approximately 60%.

Panel Zones

The panel zone of the moment frame is overstressed by approximately 270%. This may cause yielding before the frame reaches full capacity.

Strong Column-Weak Beam The strong-column/weak-beam criterion is not satisfied at either of the two moment frames. The sum of column flexural strengths is approximately 68% of the sum of beam flexural strengths. When columns yield before beams, mechanisms can form which may lead to story collapse.

Compact Members

The moment frame beam flanges are classified as "moderately ductile." Local buckling may occur in noncompact elements before the full capacity of the frame is reached.

Bottom Flange Bracing

Bottom flanges of frame beams are not braced out of plane. Local buckling may occur in unbraced members before the full capacity of the frame is reached.

Openings at Frames

The diaphragm opening for the stairs in the northwest corner of the building spans approximately 50% of the moment frame bay length. The ability of the diaphragm to transfer lateral forces to the moment frame is limited by this opening.

Cross Ties

Cross ties are not continuous through the diaphragm discontinuity. Continuous cross ties are required to develop the out-of-plane forces in walls.

Diagonally Sheathed and Unblocked Diaphragms The span of the unblocked diaphragm exceeds 30 feet. Unblocked diaphragms are prone to premature failure due to joist rolling, especially when spans exceed the recommended distance.

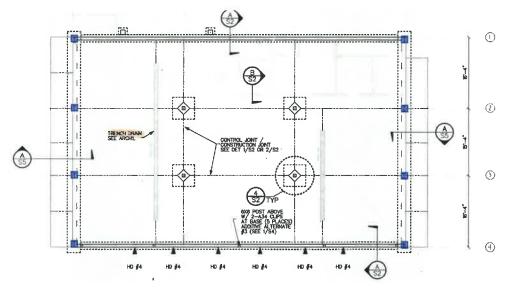
3.8.3 Findings and Recommendations

Fire Station 64 does not meet the IO performance level as determined by the ASCE 41-17 Tier 1 Evaluation. The wood shear walls and moment frame connections are overstressed, creating potential for damage and possible failure of the LFRS during a design-level earthquake. It is recommended that the building undergo a more-detailed evaluation and be retrofitted based on the findings of that evaluation. Based on the identified deficiencies and the age of the structure a more-detailed seismic evaluation of the structure may show that the building complies with the performance objective.

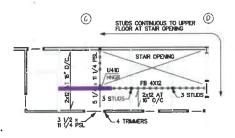
Irrespective of a more-detailed evaluation, Figures 3.8-3 and 3.8-4 display schematic-level upgrade concepts to improve the LFRS and meet the IO performance objective. The upgrade concept involves adding shear capacity to the lateral system in both the longitudinal and transverse directions throughout the building, adding collector elements at discontinuous shear walls, adding nailing and blocking to the roof, and improving connections between floors of the lateral system.

The existing steel moment-frame columns, beams, and connections on the north and south elevations will be strengthened. To increase shear capacity of the wood lateral system, existing shear walls will be strengthened and hold-downs and straps added between floors to transfer load. Collectors are also being added below discontinuous shear walls to adequately transfer seismic loads to the lateral system at the first floor. The shear-wall-to-roof connections and collector elements should be installed to provide a complete load path for the building to resist seismic loads.

Supplementary nailing and blocking are added to the apparatus bay roof to increase the roof diaphragm's capacity and strength. The connection between the diaphragm and shear walls and moment frames should also be improved using roof-to-wall ties to ensure the forces are transferred to the shear walls. This upgrade will increase the diaphragm's stiffness and the diaphragm's shear capacity.



FOUNDATION PLAN

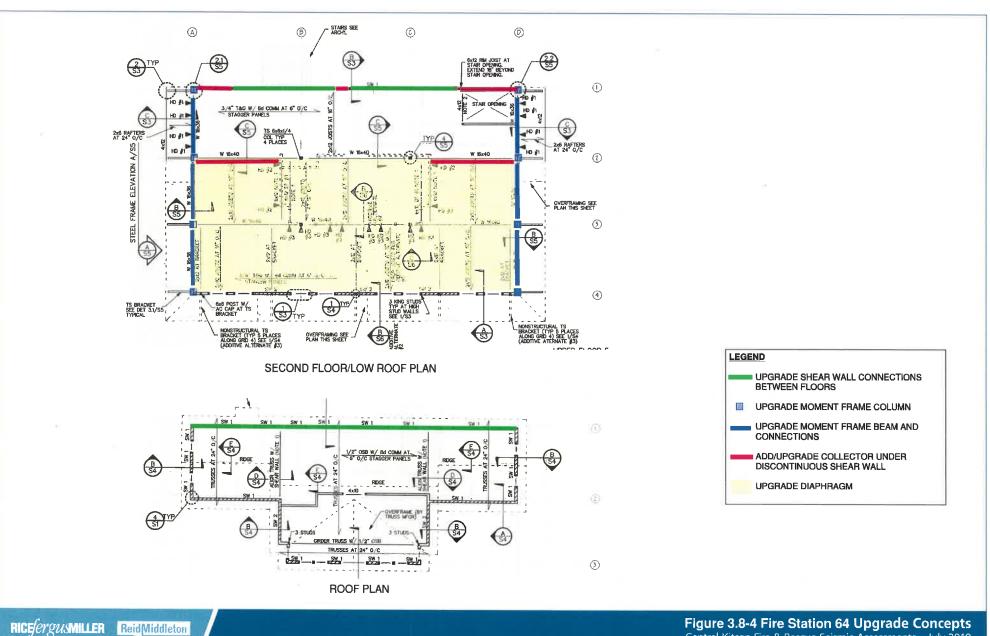


MEZZANINE PLAN

LEGEND

■ UPGRADE MOMENT FRAME COLUMN

DIAPHRAGM STRAPPING AT OPENING



17-3 Immediate Occupancy Basic Configuration Checklist

Very Low Seismicity

Building System - General

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				LOAD PATH: The structure contains 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. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.1)	
		х		ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)	
X				MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	

Building System – Building Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)	
X				SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not 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 stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)	
	х			VERTICAL IRREGULARITIES: All vertical elements in the seismic-force- resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	Second floor walls along Grid 2 do not stack to the foundation.
X				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. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)	
X				MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)	
X	,			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. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	

17-3 Immediate Occupancy Basic Configuration Checklist

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Geologic Site Hazards

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		X LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)		granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1;	
			х	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)	
			X	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec.A.6.1.3)	

Moderate and High Seismicity

(Complete the Following Items in Addition to the Items for Low Seismicity)

Foundation Configuration

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				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 _a . (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	
		х		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. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

17-7. Immediate Occupancy Checklist for Building Type W2

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	
X				SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing, 1,000 lb/ft (14.6 kN/m); Diagonal sheathing, 700 lb/ft (10.2 kN/m); Straight sheathing, 100 lb/ft (1.5 kN/m); All other conditions, 100 lb/ft (1.5 kN/m). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec.A.3.2.7.1)	Demand: 736 lb/ft Allowable: 1000 lb/ft 736 lb/ft < 1000 lb/ft
X	1			STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multistory buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.2)	
X				GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.3)	
	X			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	Second-floor walls exceed ratio.
	X			WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Tier 2: Sec. 5.5.3.6.2; Commentary: Sec. A.3.2.7.5)	Drawings do not include a detail for strapping between floors.
		х		HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Tier 2: Sec. 5.5.3.6.3; Commentary: Sec. A.3.2.7.6)	
		х		CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Tier 2: Sec. 5.5.3.6.4; Commentary: Sec. A.3.2.7.7)	
		X		OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Tier 2: Sec. 5.5.3.6.5; Commentary: Sec. A.3.2.7.8)	Moment frames present on walls with large opening lengths at apparatus bay.
X				HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices. (Tier 2: Sec. 5.5.3.6.6; Commentary: Sec. A.3.2.7.9)	

17-7. Immediate Occupancy Checklist for Building Type W2

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
Х				WOOD POSTS: There is a positive connection of wood posts to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.3)	
X				WOOD SILLS: All wood sills are bolted to the foundation. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.4)	
X				GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		Х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3)	
		Х		SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. (Commentary: 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

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	Х			NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (Tier 2: Sec. 5.5.3.6.1; Commentary: Sec. A.3.2.7.4)	Shear walls exceed ratio at second floor and at apparatus bay east wall.

Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	Х			DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.1)	Detail B/S6 indicates a step in the diaphragm.
X				ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Tier 2: Sec. 5.6.1.1; Commentary: Sec. A.4.1.3)	
		х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)	
		Х		STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)	

17-7. Immediate Occupancy Checklist for Building Type W2

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
	Х			DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.1 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	General notes specify blocking not present unless specifically noted on plans.
Х				OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less with acceptable edge and end distance provided for wood and concrete. (Tier 2: Sec. 5.7.3.3; Commentary: Sec. A.5.3.7)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

Station 64

17-9. Immediate Occupancy Checklist for Building Types S1 and S1a

Very Low Seismicity

Seismic-Force-Resisting System

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				DRIFT CHECK: The drift ratio of the steel moment frames, calculated using the Quick Check procedure of Section 4.4.3.1, is less than 0.015. (Tier 2: Sec. 5.5.2.1.2; Commentary: Sec. A.3.1.3.1)	Calculated drift is 0.007.
X				COLUMN AXIAL STRESS CHECK: The axial stress caused by gravity loads in columns subjected to overturning forces is less than $0.10F_y$. Alternatively, the axial stress caused by overturning forces alone, calculated using the Quick Check procedure of Section 4.4.3.6, is less than $0.30F_y$. (Tier 2: Sec. 5.5.2.1.3; Commentary: Sec. A.3.1.3.2)	Calculated axial stress is $0.025F_y$.
	Х	e.		FLEXURAL STRESS CHECK: The average flexural stress in the moment-frame columns and beams, calculated using the Quick Check procedure of Section 4.4.3.9, is less than F_y . Columns need not be checked if the strong column—weak beam checklist item is compliant. (Tier 2: Sec. 5.5.2.1.2; Commentary: Sec. A.3.1.3.3)	Calculated flexural stress is $1.41F_y$ for the column and $0.96F_y$ for the beam.

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				STEEL COLUMNS: The columns in seismic-force-resisting frames are anchored to the building foundation. (Tier 2: Sec. 5.7.3.1; Commentary: Sec. A.5.3.1)	

Low Seismicity

(Complete the Following Items in Addition to the Items for Very Low Seismicity)

Seismic Force Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				REDUNDANCY: The number of lines of moment frames in each principal direction is greater than or equal to 2. The number of bays of moment frames in each line is greater than or equal to 3. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.1.1.1)	3 moment frames present on both north and south elevations.
		X		INTERFERING WALLS: All concrete and masonry infill walls placed in moment frames are isolated from structural elements. (Tier 2: Sec. 5.5.2.1.1; Commentary: Sec. A.3.1.2.1)	

Station 64

17-9. Immediate Occupancy Checklist for Building Types S1 and S1a

Connections

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X	=			TRANSFER TO STEEL FRAMES: Diaphragms are connected for transfer of seismic forces to the steel frames, and the connections are able to develop the lesser of the strength of the frames or the diaphragms. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.2)	Diaphragm connection to steel frame includes (2) 8d nails @ 4" on-center, which has a greater capacity than the typical diaphragm edge nailing of 8d @ 6" on-center.
X				STEEL COLUMNS: The columns in seismic-force-resisting frames are anchored to the building foundation, and the anchorage is able to develop the least of the following: the tensile capacity of the column, the tensile capacity of the lowest level column splice (if any), or the uplift capacity of the foundation. (Tier 2: Sec. 5.7.3.1; Commentary: Sec. A.5.3.1)	The minimum uplift force for column anchorage is dictated by foundation uplift. Approximate overturning force to cause uplift is conservatively 15 kips. Approximate overturning force determined by Section 4.5.3.6 is 14 kips.

Moderate Seismicity

(Complete the Following Items in Addition to the Items for Very Low and Low Seismicity)

Seismic Force Resisting System

C	NC	N/A	บ	EVALUATION STATEMENT	COMMENT
	х			MOMENT-RESISTING CONNECTIONS: All moment connections are able to develop the expected strength of the adjoining members based on the specified minimum yield stress of the steel. (Tier 2: Sec. 5.5.2.2.1; Commentary: Sec. A.3.1.3.4)	The flange plate is overstressed in tension by approximately 42%. The bolts connecting the flange plate to the beam are overstressed by approximately 60%.
	х			PANEL ZONES: All panel zones have the shear capacity to resist the shear demand required to develop 0.8 times the sum of the flexural strengths of the girders framing in at the face of the column. (Tier 2: Sec. 5.5.2.2.2; Commentary: Sec. A.3.1.3.5)	The panel zone is overstressed by approximately 270%.
		х		COLUMN SPLICES: All column splice details located in moment frames include connection of both flanges and the web, and the splice develops the strength of the column. (Tier 2: Sec. 5.5.2.2.3; Commentary: Sec. A.3.1.3.6)	
	X			STRONG COLUMN—WEAK BEAM: The percentage of strong column—weak beam joints in each story of each line of moment-resisting frames is greater than 50%. (Tier 2: Sec. 5.5.2.1.5; Commentary: Sec. A.3.1.3.7)	The strong-column/weak-beam criterion is not satisfied at either of the two moment frames. The sum of column flexural strengths is approximately 68% of the sum of beam flexural strengths.
	X			COMPACT MEMBERS: All frame elements meet section requirements in accordance with AISC 341, Table D1.1, for highly ductile members. (Tier 2: Sec. 5.5.2.2.4; Commentary: Sec. A.3.1.3.8)	The beam flanges are classified as "moderately ductile."
		Х		BEAM PENETRATIONS: All openings in frame-beam webs are less than one quarter of the beam depth and are located in the center half of the beams. (Tier 2: Sec. 5.5.2.2.5; Commentary: Sec. A.3.1.3.9)	

Station 64

17-9. Immediate Occupancy Checklist for Building Types S1 and S1a

X		GIRDER FLANGE CONTINUITY PLATES: There are girder flange continuity plates at all moment-frame joints. (Tier 2: Sec. 5.5.2.2.6; Commentary: Sec. A.3.1.3.10)	
X		OUT-OF-PLANE BRACING: Beam-column joints are braced out of plane. (Tier 2: Sec. 5.5.2.2.7; Commentary: Sec. A.3.1.3.11)	
	Х	BOTTOM FLANGE BRACING: The bottom flanges of beams are braced out of plane. (Tier 2: Sec. 5.5.2.2.8; Commentary: Sec. A.3.1.3.12)	

Diaphragms (Stiff or Flexible)

С	NC	N/A	N/A U EVALUATION STATEMENT		COMMENT	
		Х		PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Tier 2: Sec. 5.6.1.4; Commentary: Sec. A.4.1.7)		
		Х		DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Tier 2: Sec. 5.6.1.5; Commentary: Sec. A.4.1.8)		
	Х			OPENINGS AT FRAMES: Diaphragm openings immediately adjacent to the moment frames extend less than 15% of the total frame length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.5)	Diaphragm opening at second floor for stairs in the northwest corner is 50% of the moment frame bay length.	

Flexible Diaphragms

C	NC	N/A	U	EVALUATION STATEMENT	COMMENT
	х	X CROSS TIES: There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2) X STRAIGHT SHEATHING: All straight-sheathed diaphra; have aspect ratios less than 1-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1) SPANS: All wood diaphragms with spans greater than 12 (3.6 m) consist of wood structural panels or diagonal shea (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2) X DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked we structural panel diaphragms have horizontal spans less than (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier			
		X			
Х				SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	
	X			DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	
		х		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 (12.2 m) and have aspect ratios less than 4-to-1. (Tier 2: Sec. 5.6.3; Commentary: Sec. A.4.3.1)	

Station 64 17-9. Immediate Occupancy Checklist for Building Types S1 and S1a

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
X				OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	

High Seismicity (Complete the Following Items in Addition to the Items for Very Low, Low, and Moderate Seismicity)

Seismic Force Resisting System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT	
X MOMENT-RESIS connections are ab members or panel stress of the steel i				Moment-resisting connections checked against 1.0 times the expected yield stress was noncompliant.		

Foundation System

С	NC	N/A	U	EVALUATION STATEMENT	COMMENT
		х		DEEP FOUNDATIONS: Piles and piers are capable of transferring the seismic forces between the structure and the soil. Commentary: Sec. A.6.2.3)	
				SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story. <i>Commentary: Sec. A.6.2.4</i>)	

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.



Program Requirements

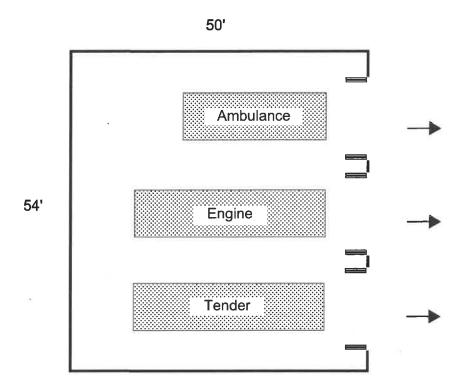
Prototype Fire Station Program Requ	irements						
		Fire	Fire	Fire	Fire	Fire	
		Station	Station	Station	Station	Station	
	0	42	45	52	53	57	
		Island Lake	North Perry	Anderson Hill	Seabeck	Coho Run	
Operations							
Apparatus Bay (3-bays, back-in)	54' x 50'	2,700	2,700	2,700	2,700	2,700	
Decon	10' x 11'	110	110	110	110	110	
Shop	8' x 10'	80	80	80	80	80	
Clean Project Room	16' x 12'6"	200	200	200	200	200	
App Bay Restroom	8' x 12'	96	96	96	96	96	
Bunker Gear Storage	15' x 21'	315	315	315	315	315	
General Storage	8' x 10'	80	80	80	80	80	
App Bay Janitorial	8' x 8'	64	64	64	64	64	
Sprinkler Riser / Compressor	6° x 10°	60	60	60	60	60	
Living Quarters							
(4) Sleep Rooms	(4) 9' x 15'	540	540	540	540	540	
(2) Restroom/Showers	(2) 8' x 12'	192	192	192	192	192	
Kitchen	14' x 20'	280	280	280	280	280	
Dining for 6	16' x 14'	224	224	224	224	224	
Dayroom for 4	16' x 19'	304	304	304	304	304	
Fitness	24' x 20'	480	480	480	480	480	
Laundry	10' x 12'	120	120	120	120	120	
Janitorial	8' x 8'	64	64	64	64	64	
Public and Front of the House							
Public Lobby	8' x 12'	96	96	96	96	96	
(1) Public Unisex Restroom	8'x8"	64	64	64	64	64	
Firefighter Work Area	18' x 20'	360	360	360	360	360	
Station Officer Office	10' x 10'	100	100	100	100	100	
Subtotal		6,529	6,529	6,529	6,529	6,529	
Mechanical / Electrical	10%	653	653	653	653	653	
Circulation	15%	979	979	979	979	979	
Total Anticipated Square Foo	otage	8,161	8,161	8,161	8,161	8,161	

End of Program Requirements



Central Kltsap Fire & Rescue Program Requirements January 14, 2018

> Apparatus Bay Size: 2,700 sf

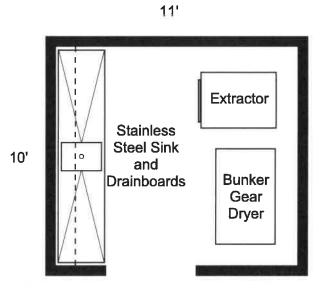


Notes:

Diesel exhaust capture system necessary
14'x14' 4-Fold Doors on Apparatus Bay
Alternate: 14'x14' Roll-up Overhead Doors
All bays identical allowing maximum flexibility on vehicle arrangement
Apparatus Bay can be used from time to time for indoor training
Apparatus Bay can be used as a shelter during a regional disaster

Clean-up / Decon

Size: 110 sf

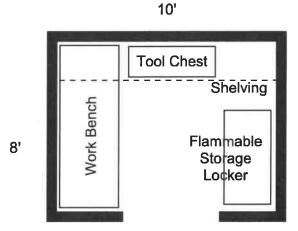


Notes:

Decontamination area for cleaning equipment, and personal decontamination Extractor for washing bunker gear and contaminated clothing Locate adjacent Bunker Gear Storage Room

Maintenance / Small Tool Shop

Size: 80 sf

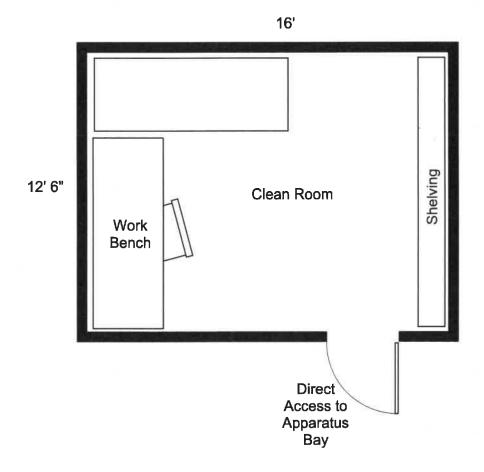


Notes:

Equipment Repair and Small Tool Work Shop Storage for flammable liquids (paints, solvents, lawn mower gas, etc.) Equipment and supplies for minor vehicle maintenance and repair

Clean Project Room

Size: 200 sf

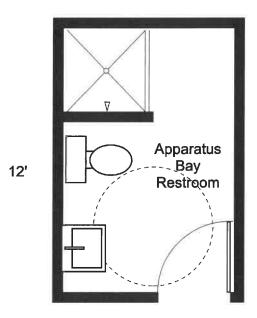


Notes:

Special project room, such as SCBA maintenance and repair. Positive air pressure to maintain dust-free environment.

Apparatus Bay Restroom Size: 96 sf

8'

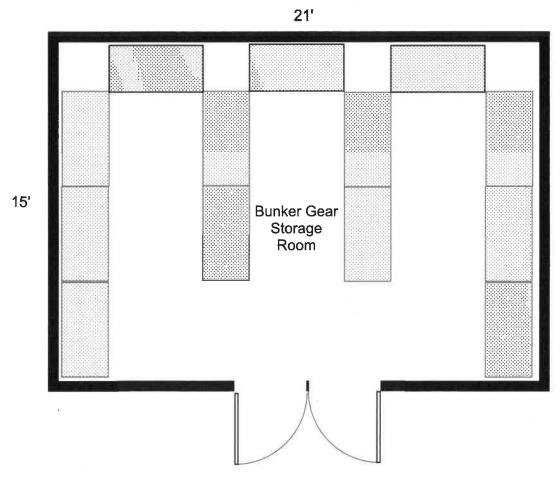


Notes:

Concrete floor; scrubable wall panels, floor to ceiling

Direct access to Apparatus Bays.

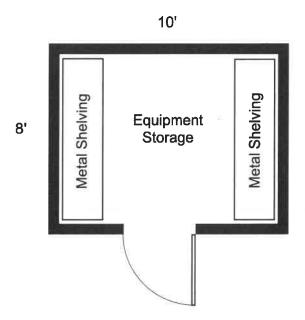
Bunker Gear Storage Room Size: 315 sf



Notes:

48" x 24" open wire gear lockers Direct access to Apparatus Bays. Located adjacent or close proximity to Decon Room.

> General Storage Room Size: 80 sf

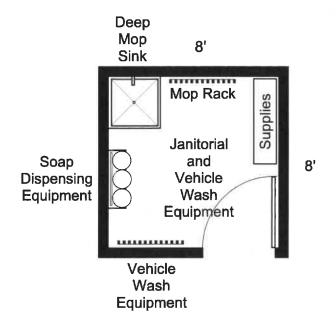


Notes:

Storage Room for miscellaneous equipment and supplies, such as ropes and rescue equipment, and extrication equipment.

Direct access to Apparatus Bays.

Apparatus Bay Janitorial / Vehicle Wash Equipment Size: 64 sf

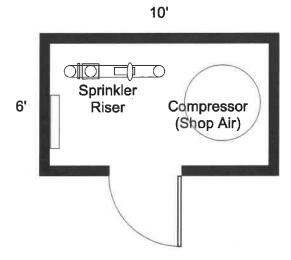


Notes:

Concrete floor; scrubable wall panels, floor to ceiling

Direct access to Apparatus Bays.

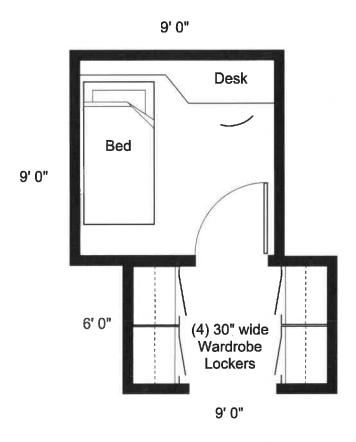
Sprinkler Riser / Compressor Room Size: 60 sf



Notes:

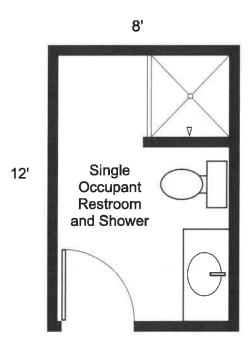
Located in vicinity of Apparatus Bays and Small Tool Shop Exterior access to this room

Sleep Room & Locker Area Size: 135 sf x 4 = 540 sf



Notes:

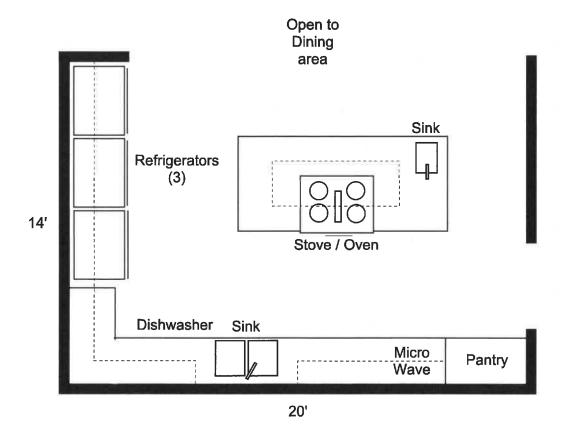
> Shower / Restroom Size: 192 sf (2 x 96 sf)



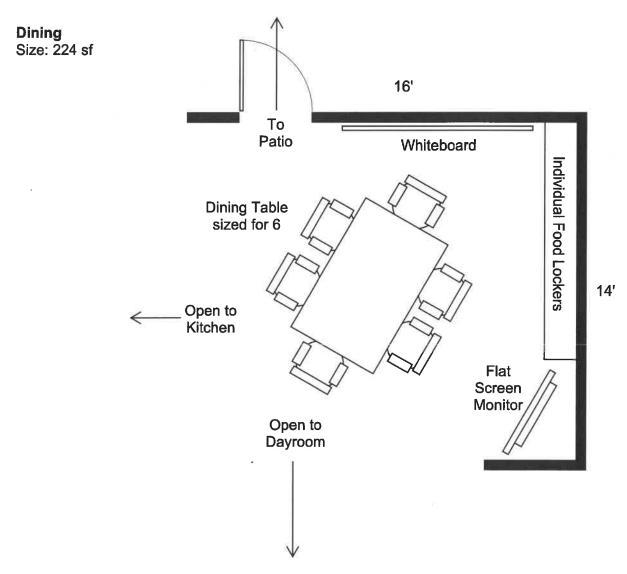
Notes:

In close proximity to single occupant sleep rooms, as well as Kitchen, Dining, and Dayroom areas.

> Kitchen Size: 280 sf



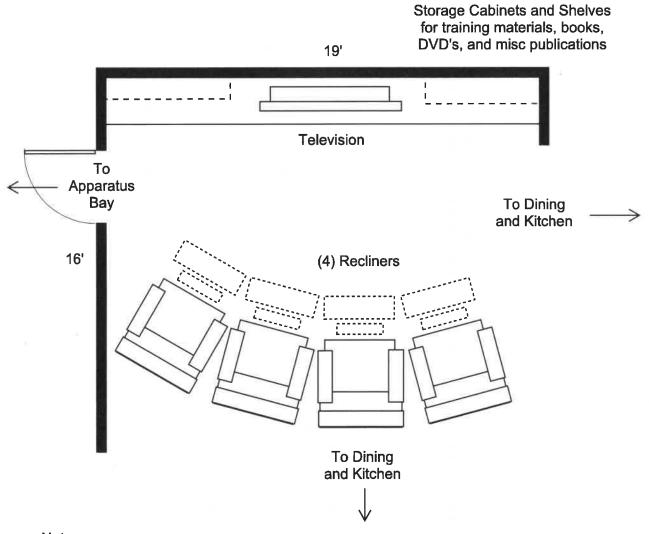
Notes:



Notes:

Kitchen, Dining, and Dayroom to be configured as an open Great Room

> Dayroom Size: 304 sf

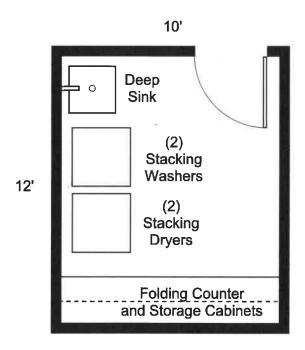


Notes:

Kitchen, Dining, and Dayroom to be configured as an open Great Room.

Physical Fitness Size: 480 sf 20' Stretch Free Weights Cardio Machines 24' Windows **Bench Press Bench Press** Notes: **Outdoor Access**

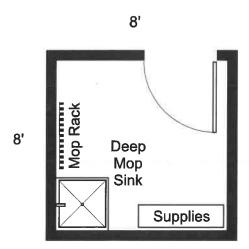
> Laundry Room Size: 120 sf



Notes:

Laundry for personal items (not for decontamination purposes).

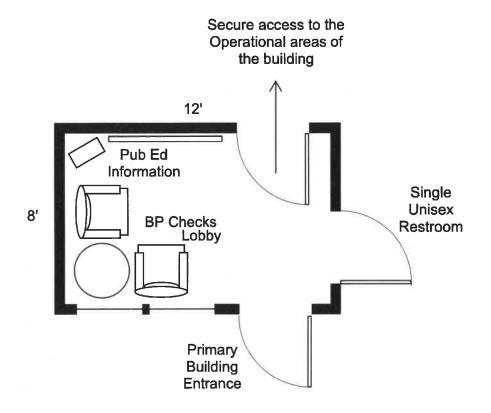
> Janitorial Size: 64 sf



Notes:

Shared janitorial supplies for administrative and living quarters areas.

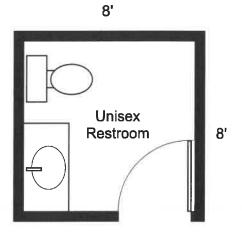
> Public Lobby Size: 96 sf



Notes:

Primary Public Entrance to the facility

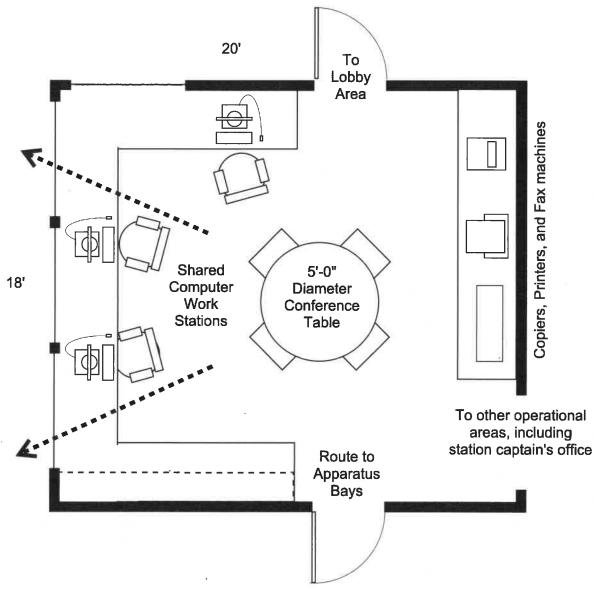
Single Unisex Restroom Size: 64 sf



Notes:

Direct access to Lobby Handicap Accessible

Shared Firefighters Work Area Size: 360 sf

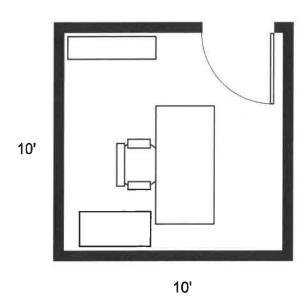


Notes:

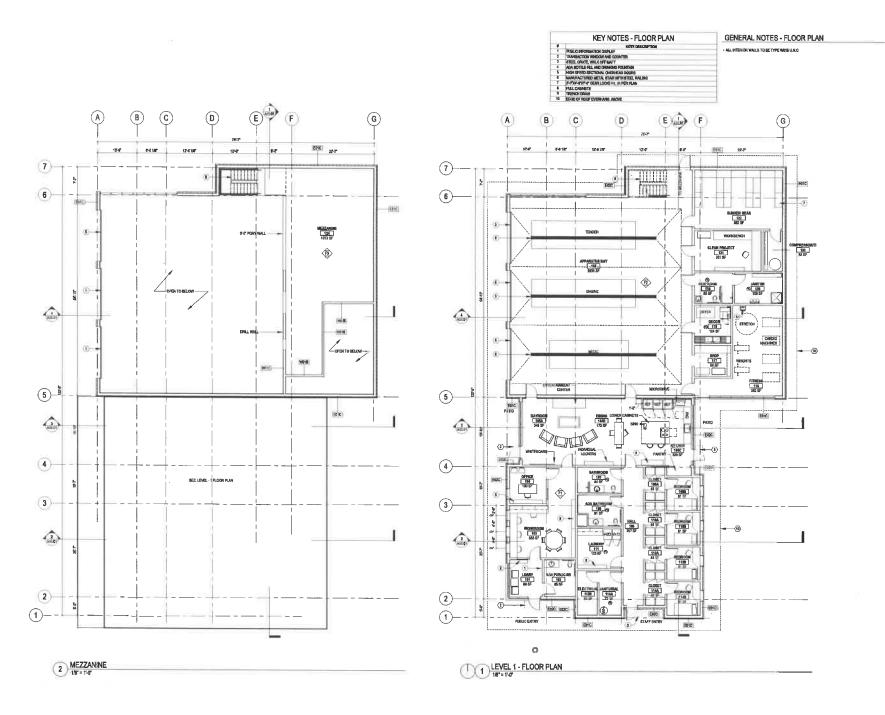
Shared firefighter work area for preparing reports, on-line training, and meetings. Work stations should be open with adjacency to the captain's office. Work area to have multiple computer work stations for concurrent use.

Office - Station Officier

Size: 100 sf



Notes:



RICEFERGUSMILLER

ARCHITECTURE BYTERDOR PLANNING VIELAS 275 FIFTH STREET, SUITE 100 BREMERTON, WA 98337 360-377-9773 RFMARCH.COM

NOT FOR CONSTRUCTION

CENTRAL KITSAP FIRE & RESCUE NEW STATION: MODEL

PROJECT # 2017000.60

PRE-DESIGN
ISSUE DATE SEPTEMBER 4, 2018
REVISION SCIENALE

FLOOR PLAN

A21.11



STATION 57 - VIEW 1



STATION 57 - VIEW 2