CITY OF KIRKLAND
Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW
9824 NE 132nd ST, Kirkland WA 98034

PROJECT MANUAL
Volume 1 (Divisions 00-08)

July 21, 2020

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

VOLUME 1 OF 2 (DIVISIONS 00-08)

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

INTRODUCTORY INFORMATION
00 00 00 COVER PAGE
00 00 01 TABLE OF CONTENTS
00 00 02 APPROVED FOR CONSTRUCTION
00 00 03 CERTIFICATE OF ARCHITECT/ENGINEER

SOLICITATION & BIDDING
00 00 10 INVITATION FOR BIDS
00 10 10 BIDDER'S CHECKLIST FORM
00 10 20 BIDDER'S QUALIFICATIONS
00 15 30 BIDDER RESPONSIBILITY CRITERIA FORM
00 15 40 BIDDER'S CERTIFICATION
00 20 00 INSTRUCTIONS TO BIDDERS

AVAILABLE INFORMATION
00 30 00 INFORMATION AVAILABLE TO BIDDERS
00 30 00a GEOTECHNICAL REPORT
00 30 00b DRAFT ROCKERY STABILITY ANALYSES

PROCUREMENT AND CONTRACTING FORMS
00 41 00 BID FORM
00 43 30 BID BOND SECURITY FORM
00 44 00 SUBCONTRACTOR IDENTIFICATION
00 45 70 RETAINAGE INVESTMENT OPTION
00 52 20 AGREEMENT FORM
00 60 00 BONDS AND CERTIFICATES
00 61 40 PERFORMANCE BOND
00 61 41 PAYMENT BOND
00 70 00 GENERAL CONDITIONS
00 75 00 SUPPLEMENTAL CONDITIONS
00 82 75 CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS AND CLAIMS
00 83 00 DEPARTMENT OF LABOR WAGE RATES

DIVISION 01 - GENERAL REQUIREMENTS

01 10 00 SUMMARY
01 21 00 ALLOWANCES
01 22 00 UNIT PRICES
01 23 00 ALTERNATES
01 26 00 CONTRACT MODIFICATION PROCEDURES
01 29 00 PAYMENT PROCEDURES
01 31 00 PROJECT MANAGEMENT AND COORDINATION
01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
01 32 33 PHOTOGRAPHIC DOCUMENTATION AND VIDEO SERVICES
01 33 00 SUBMITTAL PROCEDURES
01 40 00 QUALITY REQUIREMENTS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

01 41 00 REGULATORY REQUIREMENTS
01 42 00 REFERENCES
01 50 00 TEMPORARY FACILITIES AND CONTROLS
01 56 39 TEMPORARY TREE AND PLANT PROTECTION
01 57 13 TEMPORARY EROSION AND SEDIMENT CONTROL
01 60 00 PRODUCT REQUIREMENTS
01 61 00 SUBSTITUTION REQUEST FORM
01 73 00 EXECUTION
01 73 29 CUTTING AND PATCHING
01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 77 00 CLOSEOUT PROCEDURES
01 78 36 WARRANTIES
****** WARRANTY REPAIR REQUEST
01 81 13 SUSTAINABLE DESIGN REQUIREMENTS
01 81 19 INDOOR AIR QUALITY REQUIREMENTS
01 91 13 GENERAL COMMISSIONING REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

02 01 00 MAINTENANCE OF EXISTING CONDITIONS
02 41 00 DEMOLITION

DIVISION 03 - CONCRETE

03 10 00 CONCRETE FORMING AND ACCESSORIES
03 20 00 CONCRETE REINFORCING
03 30 00 CAST-IN-PLACE CONCRETE
03 35 43 POLISHED CONCRETE FINISHING
03 45 00 PRECAST ARCHITECTURAL CONCRETE

DIVISION 04 - MASONRY

04 20 00 MASONRY UNITS

DIVISION 05 – METALS

05 12 00 STRUCTURAL STEEL FRAMING
05 12 50 BUCKLING RESTRAINED BRACES
05 21 19 STEEL JOIST FRAMING
05 31 00 STEEL DECKING
05 40 00 COLD-FORMED METAL FRAMING
05 50 00 METAL FABRICATIONS

DIVISION 06 – WOOD AND PLASTICS

06 10 00 ROUGH CARPENTRY
06 16 00 SHEATHING
06 40 23 ARCHITECTURAL WOODWORK

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DIVISION 07 – THERMAL & MOISTURE PROTECTION

07 13 26 SELF-ADHERING SHEET WATERPROOFING
07 19 00 WATER REPELLANTS
07 21 00 THERMAL INSULATION
07 27 26 FLUID-APPLIED WATER RESISTIVE BARRIERS
07 41 13 METAL ROOF PANELS
07 42 63 METAL WALL PANELS
07 46 00 EXTERIOR SIDING AND TRIM
07 48 00 RAINSCREEN ATTACHMENT SYSTEM
07 54 19 POLYVINYL-CHLORIDE (PVC) ROOFING
07 62 00 SHEET METAL FLASHING & TRIM
07 65 00 FLEXIBLE FLASHING
07 72 00 ROOF ACCESSORIES
07 84 13 THROUGH PENETRATION FIRE STOPPING
07 92 00 JOINT SEALANTS
07 92 00 JOINT SEALANTS DATA SHEET

DIVISION 08 – OPENINGS

08 11 13 HOLLOW METAL DOORS AND FRAMES
08 14 16 FLUSH WOOD DOORS
08 31 13 ACCESS DOORS AND FRAMES
08 32 00 FOLDING ALUMINUM FRAMED GLASS DOORS
08 35 13 QUICK RESPONSE FOUR-FOLD DOORS
08 36 13 SECTIONAL OVERHEAD DOORS
08 41 13 ALUMINUM FRAMED ENTRANCES AND STOREFRONTS
08 54 13 FIBERGLASS WINDOWS AND STOREFRONTS
08 62 00 UNIT SKYLIGHTS
08 71 00 DOOR HARDWARE
08 80 00 GLAZING
08 83 00 MIRRORS
08 90 00 LOUVERS & VENTS

DIVISION 09 – FINISHES

09 29 00 GYPSUM BOARD
09 30 13 TILING
09 51 13 ACOUSTICAL PANEL CEILINGS
09 65 13 RESILIENT BASE AND ACCESSORIES
09 65 20 RESILIENT ATHLETIC FLOORING
09 85 10 FABRIC-REINFORCED RESINOUS WALL COATING
09 91 00 PAINTING

DIVISION 10 – SPECIALTIES

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

10 28 00 TOILET AND BATH ACCESSORIES
10 44 00 FIRE PROTECTION SPECIALTIES
10 75 00 FLAGPOLE
10 90 00 MISCELLANEOUS SPECIALTIES

DIVISION 11 – EQUIPMENT

11 31 00 APPLIANCES

DIVISION 12 - FURNISHINGS

12 21 13 HORIZONTAL BLINDS
12 48 13 ENTRANCE FLOOR MATS

DIVISION 21 – FIRE PROTECTION

21 00 00 FIRE SUPPRESSION GENERAL CONDITIONS
21 05 00 COMMON WORK RESULTS FOR FIRE SUPPRESSION
21 13 13 WET-PIPE SPRINKLER SYSTEMS

DIVISION 22 – PLUMBING

22 00 00 PLUMBING GENERAL CONDITIONS
22 05 00 COMMON WORK RESULTS FOR PLUMBING
22 07 00 PLUMBING INSULATION
22 08 00 COMMISSIONING OF PLUMBING
22 11 00 FACILITY WATER DISTRIBUTION
22 13 00 FACILITY SANITARY SEWERAGE
22 14 00 FACILITY STORM DRAINAGE
22 23 00 NATURAL GAS SYSTEMS
22 30 00 PLUMBING EQUIPMENT
22 40 00 PLUMBING FIXTURES

DIVISION 23 – HVAC

23 00 00 HVAC GENERAL CONDITIONS
23 01 00 LEED REQUIREMENTS
23 05 00 COMMON WORK RESULTS FOR HVAC
23 05 93 TESTING, ADJUSTING AND BALANCING
23 07 00 HVAC INSULATION
23 08 00 COMMISSIONING OF HVAC
23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC
23 23 00 REFRIGERANT PIPING
23 31 00 HVAC DUCTS AND CASINGS
23 33 00 AIR DUCT ACCESSORIES

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

23 34 00 HVAC FANS
23 35 16 VEHICLE ENGINE EXHAUST SYSTEMS
23 37 00 AIR OUTLETS AND INLETS
23 38 00 HOODS
23 40 00 HVAC FILTERS
23 51 00 CHIMNEYS AND STACKS
23 55 00 FUEL-FIRED HEATERS
23 72 00 ENERGY RECOVERY UNITS
23 81 43 AIR-COOLED, VARIABLE REFRIGERANT FLOW, MULTI-UNIT HEAT PUMP
23 83 16 ELECTRIC DUCT COILS
23 83 23 ELECTRIC TERMINAL HEATING UNITS

DIVISION 26 – ELECTRICAL

26 05 00 GENERAL ELECTRICAL PROVISIONS
26 05 11 ELECTRICAL CONNECTIONS FOR EQUIPMENT
26 05 19 LOW VOLTAGE ELECTRICAL POWER CONDUCTORS
26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
26 05 32 OUTLET BOXES FOR ELECTRICAL SYSTEMS
26 05 33 RACEWAY SYSTEMS
26 05 48 VIBRATION ISOLATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS
26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS
26 05 73 OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT CALCULATIONS
26 08 00 COMMISSIONING OF ELECTRICAL SYSTEMS
26 08 10 ELECTRICAL TESTING
26 24 10 SERVICE ENTRANCE
26 24 16 PANELBOARDS
26 27 13 UTILITY PROVISIONS AND METERING
26 27 26 WIRING DEVICES
26 28 13 OVERCURRENT PROTECTIVE DEVICES
26 28 16 DISCONNECT SWITCHES AND ENCLOSED CIRCUIT BREAKERS
26 29 13 MOTOR CONTROLLERS
26 31 00 SOLAR ENERGY ELECTRICAL POWER
26 32 13 PACKAGED ENGINE GENERATOR
26 36 00 TRANSFER SWITCHES
26 51 00 LIGHTING
26 57 00 ROADWAY LIGHTING
26 93 00 LIGHTING CONTROLS

DIVISION 27 – COMMUNICATIONS

27 11 00 TELECOMMUNICATION SYSTEM
27 41 33 TV DISTRIBUTION
27 51 16 STATION ALERTING SYSTEM

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 13 00 ACCESS CONTROL SYSTEM
28 31 11 FIRE ALARM SYSTEM

DIVISION 31 – EARTHWORK

31 00 00 EARTHWORK
31 23 19 DEWATERING
31 60 00 AGGREGATE PIER SOIL REINFORCEMENT

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 12 00 FLEXIBLE PAVING
32 13 00 CONCRETE PAVING
32 17 23 PAVEMENT MARKING AND SIGNAGE
32 31 13 CHAIN-LINK FENCES AND GATES
32 31 15 MOTOR OPERATED GATES
32 31 19 ORNAMENTAL FENCES AND GATES
32 84 00 IRRIGATION
32 91 13 SOIL PREPARATION
32 92 00 TURF AND GRASSES
32 93 00 PLANTS

DIVISION 33 – UTILITIES

33 10 00 WATER UTILITIES
33 30 00 SANITARY SEWER UTILITIES
33 40 00 STORM DRAINAGE UTILITIES
33 41 00 FOUNDATION DRAINAGE

DIVISION 34 - TRAFFIC
34 41 00 ROADWAY SIGNALING AND CONTROL EQUIPMENT
APPENDIX A – TRAFFIC SIGNAL AND ILLUMINATION SYSTEM SPECIFICATIONS.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Approved for Construction:

Rod Steitzer, P.E.
Capital Projects Manager

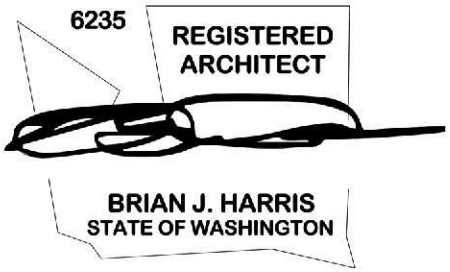
Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Architect:

The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as Professional Architect licensed to practice in the State of Washington, is affixed below.



July 21, 2020

Brian J. Harris, AIA LEED AP
Principal
TCA Architecture Planning, Inc.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Engineer:

The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as Professional Engineer licensed to practice in the State of Washington, is affixed below.

7/21/2020

Jeremy Febus, PE, LEED AP
Principal
KPFF Consulting Engineers

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Landscape Architect:

The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as a Professional Landscape Architect licensed to practice in the State of Washington, is affixed below.

7/21/2020

Craig Skipton, PLA
Director of Landscape Architecture
AHBL, Inc.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Engineer:

The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as Professional Engineer licensed to practice in the State of Washington, is affixed below.

July 21, 2020

Michael Armstrong, P.E., S.E.
Senior Project Manager
Coughlin Porter Lundeen, Inc.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Engineer:

The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as Professional Engineer licensed to practice in the State of Washington, is affixed below.

Nathan Byers, PE
Principle
Sider + Byers

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Engineer:

The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as Professional Engineer licensed to practice in the State of Washington, is affixed below.

7/21/2020

Michael Case, PE
President
Case Engineering, P.S.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS

Fire Station 24
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

Certificate of Engineer:
The technical portions of the Special Provisions and Plans contained herein have been prepared by or under the direction of the undersigned, whose seal as Professional Engineer licensed to practice in the State of Washington, is affixed below.

The Professional Engineer Seal below applies **only to the following sections**:

- 26 57 00 ROADWAY LIGHTING
- 34 41 00 ROADWAY SIGNALING AND CONTROL EQUIPMENT
- APPENDIX A - TRAFFIC SIGNAL AND ILLUMINATION SYSTEM SPECIFICATIONS

07/21/2020

Jennifer Z. Palmer, PE, PTOE
Senior Project Manager
Transpo Group

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

INVITATION FOR BIDS

City of Kirkland
Fire Station 24
9824 NE 132nd ST, Kirkland WA 98034
CIP # PSC 3002 200
JOB # 32-20-PW

The City of Kirkland invites interested and qualified contractors to submit sealed bids for the following project:

TITLE:	Fire Station 24
ESTIMATED BID AMOUNT:	Approximately $10,300,000 excluding sales tax Storm Vault Bid Alternate add approximately $990,000 excluding sales tax
BID SUBMITTAL TIME/DATE/LOCATION:	Prior to 1:00 P.M. on 18 August 2020 at City of Kirkland 123 5th Avenue Kirkland WA 98033 Bids can be mailed, or, Bidders can choose to hand deliver their bids. Please utilize the RING doorbell at the North entrance of City Hall, 123 5th Avenue, Kirkland, WA 98033. A City employee will accept and date/time stamp bid.
PUBLIC BID OPENING	Due to Governor Inslee's Stay Home Stay Healthy proclamation, the public bid opening will be available online at the following link http://kirkland.granicus.com/player/camera/7?publish_id=1308. It will commence the 18th of August 2020 at approximately 1:00 P.M. A recorded version will be posted online with the bid results.
PRE-BID CONFERENCE	8:00 A.M. on the 4th of August 2020 and 8:00 A.M. on 6th of August 2020 at 9824 NE 132nd St, Kirkland, WA 98034. Attendance at one pre-bid conference is mandatory. Please check-in upon arrival. Properly fitted masks are required for attendance. Please also maintain social distancing.

BID SUBMITTAL ENVELOPE:

Upon submittal, bids will be recorded by the City of Kirkland as to time and date received, and secured, until the time set for the public bid opening. All bid submittal envelopes must be *plainly marked on the*

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

outside with "Bid Proposal, Fire Station 24, Job # 32-20-PW." NO PROPOSALS WILL BE ACCEPTED AFTER THE BID SUBMITTAL TIME.

ITEM FOR BID:

The project consists of all work to be performed as indicated in the Project Manual, Drawings, and any posted addenda. The work consists of furnishing all labor, materials, and other incidentals for the construction of a new 11,975 square foot Fire Station and associated site and offsite work. The proposed station will be a steel framed structure with three (3) apparatus bays, support spaces, crew work space, crew living spaces, and (8) sleeping rooms. The site is approximately 2.52 acres. Site work will include site structures, storm water systems, utilities, landscaping, and paving. Offsite work will include frontage improvements, traffic improvements (including signals) and other offsite work as identified in the Contract Documents. The project has an additive bid alternate for a detention vault-based storm system in lieu of a detention pond.

Substantial Completion shall be achieved within three hundred and sixty-five (365) calendar days after the Owner's Notice to Proceed and Final Completion shall be achieved within forty-five (45) calendar days after Substantial Completion.

BID DOCUMENTS:

Free-of-charge access to project bid documents (plans, specifications, addenda, and Bidders List) is provided to Prime Bidders, Subcontractors, and Vendors by going to www.bxwa.com and clicking on "Posted Projects", "Public Works", and "City of Kirkland". This online plan room provides Bidders with fully usable online documents with the ability to: download, view, print, order full/partial plan sets from numerous reprographic sources, and a free online digitizer/take-off tool. It is recommended that Bidders "Register" in order to receive automatic e-mail notification of future addenda and to place themselves on the "Self-Registered Bidders List". Bidders that do not register will not be automatically notified of addenda and will need to periodically check the on-line plan room for addenda issued on this project. Contact Builders Exchange of Washington at (425) 258-1303 should you require assistance with access or registration. The content available through bxwa.com is our property or the property of our licensors and is protected by copyright and other intellectual property laws. Access to project documents is intended for use by bidders (general contractors/prime bidders, subcontractors and suppliers), agency personnel and agency's consultants, as well as for personal, noncommercial, use by the public. You may display or print the content available for these uses only. "Harvesting" (downloading, copying, and transmitting) of any project information and/or project documents for purposes of reselling and/or redistributing information by any other party is not allowed by BXWA.

Questions regarding this project shall be submitted in writing to Anneke Davis (adavis@kirklandwa.gov) via e-mail with the subject line of "FS24: Bid Question". Questions received via phone or any other method other than e-mail with the appropriate subject line will not be accepted. Bidders shall submit questions no later than 7 calendar days prior to the scheduled bid opening.

CONTRACTOR REGISTRATION:

Pursuant to RCW 39.06, the bidder shall be registered and licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27.

In order to perform public work, the successful bidder and subcontractors, prior to Contract award, shall hold or obtain such licenses and registrations as required by State Statutes and Codes, and Federal and local laws and regulations and a City of Kirkland business license.

BID SECURITY:

Certified check, bank cashier's check or bid bond congruent with the Bid Bond Security Form (Section 00 43 30) as identified in the "Instructions to Bidders" is required to be submitted with each proposal, in

Provided to Builders Exchange of WA, Inc. For usage conditions Agreement see www.bxwa.com - Always Verify Scal

BIDDER'S CHECKLIST

The omission or deletion of any bid item may be considered non-responsive and may be cause for the rejection of the bid.

1. ☐ Has a bid bond or certified check been enclosed with your bid? Is the amount of the bid guaranty at least 5 percent of the total amount of the bid?
2. ☐ Has the proposal been properly completed and signed? Do written amounts on the proposal agree with the amounts shown in the figures?
3. ☐ Have you bid on all items including, if applicable, all alternates?
4. ☐ Have you acknowledged all addenda, if any, in the Bid Form (Section 00 41 00)
5. ☐ Do not submit any of the forms still attached to the Project Manual. Remove or copy the forms and submit in the sealed envelope as directed.
6. ☐ Are you and all your subcontractors familiar with the schedule of value requirements including but not limited to the required placement of 5% of the bid for work between substantial completion and final completion?
7. ☐ Have you reviewed the Bidder's Qualifications and Bidder Responsibility Criteria forms and understand these obligations if you are selected as the apparent low bidder?
8. The following items must be completed and included with the Bid Form within the sealed envelope:

   A. ☐ **Bid Form (00 41 00)** The bid price must be shown in the space provided. Show price in both words and figures. The bid form must be completed in full, signed, and dated.

   B. ☐ **Bidder's Qualifications Form (00 10 20):** This form must be filled in and signed. The owner reserves the right to check all statements and to judge the adequacy of the bidder's qualifications.

   C. ☐ **Bid Bond Security Form (00 43 30):** A surety issued bid bond must be executed by the bidder and its surety company. The amount of the bid bond shall be not less than five (5%) of the total bid and may be shown in dollars or on a percentage basis. A cashier's check payable to the City of Kirkland and issued for an amount not less than 5% of the total bid may be submitted in lieu of a bid bond.

   D. ☐ **Non-Collusion, Bidder Responsibility, and Minimum Wage Certification Form (00 15 40):** This form must be filled in, signed, and notarized.

   E. ☐ **Subcontractor Listing (00 44 00):** This form must be filled in and signed if the estimated bid amount exceeds $1,000,000 as required by RCW 39.30.060. (One hour after published bid submittal time for HVAC and electrical subcontractors; 48 hours after published bid submittal time for structural steel installation and rebar installation subcontractors.)

9. The following forms are to be executed after the contract is awarded:

   A. ☐ **AGREEMENT FORM (00 52 20):** This agreement to be executed by the successful bidder.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. ☐ **PERFORMANCE BOND (00 61 40):** One hundred percent of the Contract Price to be executed by the successful bidder and his surety company. The surety on such bonds shall be a duly authorized surety company satisfactory of the Owner.

C. ☐ **LABOR MATERIALS AND TAXES BOND (PAYMENT BOND) (00 61 41):** One hundred percent of the Contract Price to be executed by the successful bidder and his surety company. The surety on such bonds shall be a duly authorized surety company satisfactory of the Owner.

D. ☐ **RETAINAGE INVESTMENT OPTION (00 45 70):** This agreement to be executed by the successful bidder.

J. ☐ **CERTIFICATES OF INSURANCE (00 60 00):** To be executed by the successful bidder and by an acceptable insurance company. The City of Kirkland must be named as an additional insured.

K. ☐ **CONTRACTOR'S CERTIFICATION (00 83 00):** Concerning Labor Standards and Prevailing Wage Requirements. Submit Statement of Intent to Pay Prevailing Wages. (Form F 700-029-000, available at Offices of Washington State Department of Labor and Industries).

10. ☐ Special Note: Prior to commencing work, the Contractor and all subcontractors must have applied and paid for a City of Kirkland Business License.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BIDDER'S QUALIFICATIONS

Each bidder submitting a proposal for this Project shall submit, as part of its bid, the following information:

1. Name of Bidder: _____

2. Business Address: _____
   _____
   _____

3. Telephone Number and Area Code: _____

4. IRS Federal Employer's Identification Number: _____

5. Current State Unified Business Identification Number_____

6. Number of years engaged in the contraction business under the present firm Name: _____

7. Total value of contracts in force: _____

8. To qualify for bidding for this project the General Contractor as the legal entity bidding the project shall have constructed within the past (4) four years the following:

   A. A demonstrated body of work of similar complexity, to include a new Fire Station, LEED construction, and similar construction cost. AND
   B. Minimum (1) One Municipal project with a total combined value of $8 million dollars or greater.

9. List below project(s) which meet Items A and/or B as outlined above. *(Attach additional project pages if required)*

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

Project Name: _____
Project Value: _____
Reference Name, phone number and email: _____

10. Recent significant projects completed by Bidder including owner's name, Approximate cost, and completion date:

    1. _____

    2. _____

    3. _____

    4. _____

11. Washington State Contractor Registration Number: _____

12. Bonding Reference: _____
    _____

13. Bonding Capacity: _____

Bidder:

By: _____ Title: _____ Date: _____

This Form Must Be Submitted with the Bid.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BIDDER'S RESPONSIBILITY CRITERIA

Low Responsible Bidder

It is the intent of the Owner to award a contract to the low responsible bidder. The Bidder must meet the minimum project bidding requirements outlined in Section 00 10 20 Bidder's Qualifications Section, Item 8.

In addition, the Owner shall consider an overall accounting of the items listed below which the bidder must meet. The bidder must submit the Non-Collusion, Bidder Responsibility, and Minimum Wage Certification Form (00 15 40) demonstrating that they meet the following criteria:

Bid Procedures and Conditions

Qualifications of Bidder

A. Bidders must meet the minimum qualifications of RCW 39.04.350, as amended:
"Before award of a public works contract, a bidder must meet the following responsibility criteria to be considered a responsible bidder and qualified to be awarded a public works project. The bidder must:
   (a) At the time of bid submittal, have a certificate of registration in compliance with chapter 18.27 RCW;
   (b) Have a current State unified business identifier number;
   (c) If applicable, have industrial insurance coverage for the bidder's employees working in Washington as required in Title 51 RCW; an employment security department number as required in Title 50 RCW; and a State excise tax registration number as required in Title 82 RCW; and
   (d) Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).
   (e) If bidding on a public works project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of the bid solicitation; and
   (f) Have received training on the requirements related to public works and prevailing wage under this chapter and chapter 39.12 RCW. The bidder must designate a person or persons to be trained on these requirements. The training must be provided by the department of labor and industries or by a training provider whose curriculum is approved by the department. The department, in consultation with the prevailing wage advisory committee, must determine the length of the training. Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this subsection. The department of labor and industries must keep records of entities that have satisfied the training requirement or are exempt and make the records available on its web site. Responsible parties may rely on the records made available by the department regarding satisfaction of the training requirement or exemption; and

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

(f) Until December 31, 2013, not have violated RCW 39.04.370 more than one time as determined by the Department Of Labor And Industries.

B. In addition to the bidder responsibility criteria above, the bidder must also meet the following relevant supplemental bidder responsibility criteria applicable to the project:

a. The Bidder shall not currently be debarred or suspended by the Federal government. The Bidder shall not be listed as a current debarred or suspended bidder on the U.S. General Services Administration's "Excluded Parties List System" website. Bidder debarment or suspension status may be verified through this website: http://www.sam.gov/. The Owner may also use other sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

b. The Bidder shall not owe delinquent taxes to the Washington State Department of Revenue, without a payment plan approved by the Washington State Department of Revenue. The Bidder shall not be listed on the Washington State Department of Revenue's "Delinquent Taxpayer List", which may be verified at the following website: http://dor.wa.gov/content/fileandpataxes/latefiling/dtlwest.aspx. The Owner may also use other sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

c. The Bidder shall not have been convicted of a crime involving bidding on a public works contract within five (5) years prior to the bid submittal deadline. The Bidder shall provide a duly executed sworn statement (on the included form, or on a form otherwise determined to be acceptable by the Owner), that the Bidder has not been convicted of a crime involving bidding on a public works contract. The Owner may also use independent sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental.

d. The Bidder's standard subcontract form shall include the subcontractor responsibility language required by RCW 39.06.020, and the Bidder shall have an established written procedure which the Bidder uses to validate the responsibility of each of its subcontractors. The Bidder's subcontract form shall also include a requirement that each of its subcontractors shall have and document a similar procedure to determine whether the sub-tier subcontractors with whom it contracts are also "responsible" contractors as defined per RCW 39.06.020. The Owner may also use independent sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

e. The Bidder shall not have a record of prevailing wage complaints filed against the Bidder within five (5) years prior to the bid submittal date that demonstrates a pattern of failing to pay workers prevailing wages, unless there are extenuating circumstances that are acceptable to the Owner. The Owner may also use independent sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

f. The Bidder shall not have had any public works contract terminated for cause by a government agency during the five (5) year period immediately preceding the bid submittal deadline for the project, unless there are extenuating circumstances acceptable to the Owner. The Bidder shall provide a duly executed sworn statement (on the included form, or in a form otherwise determined to be acceptable by the Owner), that the Bidder has not had any public works contract terminated for cause by a government agency during the five (5) year period immediately preceding the bid submittal deadline for the project. The Owner may also use independent sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

g. The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects within three (3) years of the bid submittal date, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its subcontractors, suppliers, and workers, unless there are extenuating circumstances which are acceptable to the Owner. The Owner may also use independent sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

h. Within two (2) years prior to the bid submittal date the Bidder shall not have had a project construction site shut down due to a safety violation (i.e., WISHA / OSHA written citations) from the Washington State Department Labor & Industries or analogous agency with jurisdiction in the location the work was performed, regardless of whether such willful and/or serious safety violations have been abated or not. The Bidder shall maintain compliance with all safety and health requirements (i.e., WISHA / OSHA) from the Washington State Department Labor & Industries (or analogous agency with jurisdiction in the location the work is performed). The Owner may verify such information provided with the Washington State Department Labor & Industries or analogous agency with jurisdiction in the location the work was performed. The Owner may also use other sources of information that may be available to otherwise determine whether the Bidder is in compliance with these supplemental criteria.

C. If a Bidder fails to supply the required bidder responsibility documentation, information, or materials, then Bidder may be determined by the Owner to be non-responsive, and the bid may be rejected on this basis. If the Owner determines the apparent successful bidder does not meet the bidder responsibility criteria above and is therefore not a responsible bidder, the Owner shall notify the bidder in writing with the reasons for its determination. If the bidder disagrees with this determination, it may appeal the determination within twenty-four (24) hours of receipt of the Owner's determination by presenting additional written information to the Owner. The Owner will consider the additional information before issuing its final determination. If the Owner's final determination affirms that the bidder is not responsible, the Owner will not execute a contract with any other bidder until two (2) business days after the bidder determined to be not responsible has received the final determination. Please note that the above-described information, materials, and documentation requested by the Owner for purposes of determining Bidder responsibility is not necessarily exclusive, and the Owner expressly reserves the right to request additional information, materials, and

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

documentation as may be determined to be necessary or desirable by the Owner in order to evaluate and determine Bidder's compliance with the above-described bidder responsibility criteria. At all times, the Owner may also use other sources of information that may be available to otherwise determine whether the Bidder is in compliance with the forgoing bidder responsibility criteria.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

NON-COLLUSION, BIDDER RESPONSIBILITY, AND MINIMUM WAGE CERTIFICATION FORM

In accordance with the Contract Documents and Instructions to Bidder, the Bidder must provide the following sworn statement and certification:

Name of Bidder: _____

Address: _____

Telephone No._____

E-Mail:_____

I, _____ , the undersigned declarant, as the duly authorized representative on behalf of _____ _____ (herein the "Bidder") hereby make this declaration on the basis of facts within the scope of my first hand knowledge and authority to which I am competent to testify:

1. I hereby certify, swear and affirm under penalty of perjury, that the Bidder, as of the date of this declaration (below) meets all of the minimum bidder responsibility qualifications of RCW 39.04.250, as amended.

2. I hereby certify, swear and affirm under penalty of perjury, that the Bidder, as of the date of this declaration (below) meets all of the minimum project bidding requirements outlined in the Bidder's Qualifications Form (Section 00 10 20) Item 8, if any.

3. I hereby certify, swear and affirm under penalty of perjury, that the Bidder, as of the date of this declaration (below) meets all of the supplemental bidder responsibility criteria as set forth in the Bidder's Responsibility Criteria (Section 00 15 30), Section B.

4. I hereby certify, swear and affirm under penalty of perjury, that the undersigned is the person that submitted the bid herewith, that such bid is genuine and not a sham or collusive, or made in the interest of any person not therein named; and he/she further says that said Bidder has not directly or indirectly induced or solicited any Bidder on the above work or supplies to put in a sham bid, or any other person or corporation to refrain from bidding; and that said Bidder has not in any manner sought by collusion to secure to himself or to any other person an advantage over any other Bidder or Bidders.

5. I hereby certify, swear and affirm under penalty of perjury, that in connection with the performance of the work of this Project, if awarded, I will pay each classification of laborer, workman, or mechanic employed in the performance of such work; not less than the prevailing rate of wage or not

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

less than the minimum rate of wages as specified in the Contract Documents.

Signed under penalty of perjury under the laws of the State of Washington this _____ day of _____ 20__, at _____, Washington.

Name of Bidder/Contractor:_____

Signature: _____
Print Name:_____
Title: _____

STATE OF WASHINGTON
} ss.
COUNTY OF _____

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that he/she was duly authorized execute the instrument and acknowledged it as the _____of _____,___ to be the free and voluntary act of such party for the uses and purposes herein mentioned.

DATED this _____ day of _____, 20__.

(SEAL)

_____
Notary Public
Print name:_____
Residing at _____
My commission expires _____

NOTICE TO ALL BIDDERS

To report bid rigging activities call: 1-800-424-9071

The U.S. Department of Transportation (USDOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., ET. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of USDOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the USDOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

INSTRUCTION TO BIDDERS

A. EXAMINATION OF SITE AND CONSTRUCTION DOCUMENTS

1. Before submitting a proposal, the bidder shall:
   a. Carefully examine the drawings and specifications,
   b. Visit the site of the work, (Bidders are required to attend one of the two pre-bid conference meetings on site)
   c. Fully inform itself of existing conditions and limitation, relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of its obligation to furnish all material and labor necessary to carry out the provisions of this contract.
   d. Rely entirely upon its own judgment in making its proposal,
   e. Include in its bid a sum sufficient to cover all items required by the contract including all labor, materials, services, and incidentals necessary to complete this project.

B. ADDENDA AND INTERPRETATIONS

Bidders shall promptly notify the City of Kirkland of any ambiguity, inconsistency or error which they may discover upon examination of the Project Manual, Drawings, and any Addenda or of the site and local conditions.

Bidders requiring clarification or interpretation of the Project Manual, Drawings, and/or any Addenda shall provide a written request to the City of Kirkland at least seven (7) days prior to the date for receipt of Bids.

Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Project Manual and Drawings. Any interpretation, correction or change of the Project Manual, Drawings, and any Addenda made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

Failure of any bidder to receive Addenda shall not relieve any such bidder from any obligation under its bid as submitted. All Addenda so issued shall become part of the Contract Documents. Bidders shall acknowledge receipt of all Addenda, if any, on the Bid Form. Failure to do so may result in the bid being declared non-responsive.

No oral statements by Owner, Engineer, Architect, or other representative of the Owner shall, in any way, modify the Project Manual, Drawings, and any Addenda whether made before or after letting the Contract.

Questions regarding this project shall be submitted in writing to Anneke Davis (adavis@kirklandwa.gov) via e-mail with the subject line of “FS24: Bid Question”. Questions received via phone or any other method other than e-mail with the appropriate subject line will not be accepted. Bidders shall submit questions no later than seven (7) calendar days prior to the scheduled bid opening.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. PRODUCT SUBSTITUTIONS:

1. Substitutions: Bids must be based upon the specific articles and materials named in the Project Manual, Drawings, and any Addenda. Substitution may be made only under the following conditions:
   a. Prior to Bid Opening: Not less than seven (7) calendar days prior to bid opening, prime bidders may submit to the City of Kirkland written requests for approval of articles or materials, accompanied by complete descriptions, technical data and samples. Approval or rejection of the proposed substitutions will be made by addenda issued to all bidders. Submit material/product requests as specified in Section 01 61 00 to Anneke Davis (adavis@kirklandwa.gov) via e-mail with the subject line of "FS24: Substitution Request". Requests received via phone or any other method other than e-mail with the appropriate subject line will not be accepted. Bidders shall submit substitution requests no later than seven (7) calendar days prior to the scheduled bid opening.
   b. After Award of Contract: Approval of substitution will be made only in exceptional cases where the Contractor submits satisfactory evidence to the City of Kirkland that through no fault of its own, specified or otherwise approved items cannot be obtained in time to avoid delay to the work. Approval in such cases shall conform to the other requirements above.

D. BID FORM (Section 00 41 00)

Bids must be submitted on and according to the Bid Form. Fill in all spaces. Bids shall not contain any recapitulation of work done. State numbers in writing and in figures. Completed form must be without interlineation, alteration or erasure. Signatures shall be in longhand. The bid price (s) for the work as specified in the Project Manual, Drawings, any Addenda and any Alternates must be the total price to cover all items required by the contract including all labor, materials, services, taxes, permits, and incidentals necessary to complete this project.

E. POWER OF ATTORNEY

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of the power of attorney.

F. ORAL AND TELEGRAPHIC BIDS

Oral and telephonic modifications of bids cannot be considered.

G. SUBMISSION OF BID

Enclose bid and bid bond in opaque sealed envelope, as indicated in the Invitation to Bid; Deliver in person or by post. Bidder is responsible for delivery of bid at or before the time set for bid opening. The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

to carry out the obligation of the contract and to complete the work contemplated therein. Conditional bids will not be accepted. No proposal or bid may be changed after the time set for receiving bids.

H. BID BOND

Each bidder agrees to furnish a certified check, bank cashier's check, or bid bond in the amount equal to five percent (5%) of the total base bid plus addictive alternative bids (if applicable) within its bid proposal. Failure to provide this bid security when required shall render the bid non-responsive. The right is reserved to hold the bid security of the three lowest bidders until the award of the contract or for a period of (60) sixty days, whichever is the shorter time. Bids of all unsuccessful bidders will be returned as soon as feasible after the bid opening.

I. WITHDRAWAL OF BIDS

Any bidder may withdraw its bid either personally or by written request at any time prior to the hour set for the bid opening. No bid may be withdrawn or modified after the time set for opening unless and until the award of the contract is delayed for period exceeding (60) sixty days.

J. TIME OF COMPLETION AND LIQUIDATED DAMAGES

The Owner can issue Notice to Proceed at any time after contract execution. Bidder must agree to commence work within 10 calendar days of receipt of the Notice to Proceed; and Substantially Complete the Work within 365 consecutive calendar days of the date of the Notice to Proceed, and to Finally Complete the Work within forty-five (45) consecutive calendar days thereafter. Bidder must agree to pay as liquidated damages the sum of $1975 for each consecutive calendar day that Substantial Completion is delayed and the sum of $535 thereafter for each consecutive calendar day that Final Completion is delayed. Liquidated damages have been established based on the estimated cost that will be incurred by City of Kirkland in the event the Contractor fails to complete the Work in the time stipulated.

K. SECURITY FOR FAITHFUL PERFORMANCE

Simultaneously with its delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of the Contract and for payment of all persons performing labor under the Contract and furnishing material or services in connection with the Contract as described in the Contract Documents. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner, registered in the State of Washington, Insurance Commissioner's Office. List Bonding Agent and address of same.

L. INSURANCE

The Contractor shall obtain such construction insurance as is set forth in Section 00 60 00 "Bonds and Certificates."

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

M. QUALIFICATIONS OF BIDDERS

Bidder must meet all criteria set forth in the Bidder's Qualifications (Section 00 10 20), Item 8 and the Bidder's responsibility Criteria in Section 00 15 30). The Owner may make such investigations as necessary to determine the ability of a Bidder to perform the work, and the Bidder shall furnish all such information and data as may be requested prior to bidding. The Owner reserves the right to reject any bid if the evidence submitted by, or if investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to perform the obligations of the Contract and to complete the work contemplated therein. Conditional Bids will not be accepted.

N. LAWS AND REGULATIONS

The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they shall be deemed to be included in the Contract the same as though written out in full therein. Bidders are advised that if successful, they will be required to meet all applicable federal, state, and local laws pertaining to permits, licenses, fees and taxes, as well as laws pertaining to employment and wages. Bidders are responsible for determining the extent and applicability of such laws.

O. AWARD OF THE CONTRACT/REJECTION OF BIDS

1. The Contract will be awarded to the responsible bidder submitting the lowest proposal complying with the condition of the Invitation for Bid and these contract documents provided the bid is reasonable and in the best interest of The Owner. Items in this bid, approved for contract by City of Kirkland, shall be awarded by the City of Kirkland.
2. City of Kirkland reserves the right to select, or not select, all or individual alternate bid items whichever is determined to be in the best interest of the City of Kirkland. The City of Kirkland has the right to determine the low bidder on the basis of the sum of the Base Bid and Alternates accepted.
3. City of Kirkland reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in the interest of the Owner.
4. The bidder to whom the award is made will be notified at the earliest practicable date.

P. DISQUALIFICATION OF BIDDERS

Any one or more of the following causes may be considered sufficient for the disqualification of a Bidder and the rejection of its bid or bids:

a. Evidence of collusion among Bidders.
b. Lack of expertise as shown by past work, and judged from the standpoint of workmanship and performance history.
c. Uncompleted work under other contracts which, in the judgment of the City, might hinder or prevent the prompt completion of additional work if awarded.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

d. Being in arrears on existing contracts, in litigation with an Owner, or having defaulted on a previous contract.
e. Contractor's naming oneself as a Subcontractor for which they have no expertise and working knowledge directly within the firm.
f. Contractor's inability to meet the Bidder's Qualifications (Section 00 10 20) outlined in item 8.
g. Contractor's inability to meet the Bidder's Responsibility Criteria outlined in Section 00 15 30.
h. Failure to comply with any requirements of the Invitation for Bid or Instructions to Bidders.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

INFORMATION AVAILABLE TO BIDDERS

The following documents are provided for the Contractor's reference. These documents are part of the Contract Documents and are made available to the Contractor for information only.

A. Topographic Survey City of Kirkland Fire Station 24, prepared by David Evans and Associates Inc., dated August 30, 2019, included in drawings.

B. Geotechnical Report, Fire Station 24 Replacement, Kirkland, Washington, prepared for the City of Kirkland by HWA Geosciences, Inc. dated June 8, 2020.

C. Draft Geotechnical Report, Fire Station 24 Replacement, Rockery Slope Stability Analyses, Kirkland, Washington, prepared for the City of Kirkland by HWA Geosciences, Inc. dated July 14, 2020.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

GEOTECHNICAL REPORT
Fire Station 24 Replacement
Kirkland, Washington

HWA Project No. 2018-057-21

Prepared for
City of Kirkland

June 8, 2020

HWA | GeoSciences Inc.
DBE/MWBE

Geotechnical Engineering
Pavement Engineering
Geoenvironmental
Hydrogeology
Inspection & Testing

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HWA GEOSCIENCES INC.
DBE/MWBE

June 8, 2020
HWA Project No. 2018-057-21

City of Kirkland, Public Works Department
123 5th Avenue
Kirkland, Washington 98033

Attention: Anneke J. Davis, P.E., Senior Capital Projects Coordinator

Subject: **GEOTECHNICAL REPORT**
Fire Station 24 Replacement
Kirkland, Washington

Dear Ms. Davis,

We are pleased to present this geotechnical report prepared in support of the Fire Station 24 replacement project in Kirkland, Washington. The purpose of this study was to evaluate the soil and groundwater conditions at the project site and to provide geotechnical recommendations for the design and construction of the facility.

We appreciate the opportunity to provide geotechnical engineering services on this project. If you have any questions regarding this report or require additional information or services, please contact us at your convenience.

Sincerely,

HWA GEOSCIENCES INC.

Bryan Hawkins, P.E.
Senior Geotechnical Engineer

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

TABLE OF CONTENTS

Page

1. INTRODUCTION 1
   - 1.1 General 1
   - 1.2 Project Description 1
   - 1.3 Scope of Services and Authorization 1
2. FIELD AND LABORATORY TESTING 2
   - 2.1 Field Investigation 2
   - 2.2 Geotechnical Laboratory Testing 3
   - 2.3 Environmental Laboratory Testing 3
3. SITE CONDITIONS 5
   - 3.1 Surface Conditions 5
   - 3.2 General Geologic Conditions 5
   - 3.3 Subsurface Conditions 5
     - 3.3.1 Soils 5
     - 3.3.2 Groundwater 6
4. CONCLUSIONS AND RECOMMENDATIONS 6
   - 4.1 General 6
   - 4.2 Seismic Considerations 7
     - 4.2.1 Design Parameters 7
     - 4.2.2 Near Fault Ground Motion Considerations 8
     - 4.2.3 Liquefaction Susceptibility 8
     - 4.2.4 Liquefaction Settlement Analysis 9
   - 4.3 Fire Station Foundation Design 9
     - 4.3.1 Spread Footing Foundations 10
     - 4.3.2 Spread Footing Construction 10
     - 4.3.3 Design for Closed-ended Pipe Piles 10
     - 4.3.4 Rammed Aggregate Piers (RAP) 11
     - 4.3.5 Mat Foundation 12
     - 4.3.6 Drainage 12
     - 4.3.7 Resistance to Lateral Loads 12
     - 4.3.8 Lateral Earth Pressures 12
     - 4.3.9 Slab-On-Grade 13
   - 4.4 Onsite Infiltration Pond 13
   - 4.5 Pavement Design 15
     - 4.5.1 Flexible Pavement Sections 15
     - 4.5.2 Rigid Pavement Section 16
   - 4.6 Signal Pole & Luminaire Foundations 17
   - 4.7 Rockery Condition Assessment 18
     - 4.7.1 Introduction 18

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.7.2 Evaluation Program 18
4.7.3 Rockery Conditions 19
4.7.4 Concrete Retaining Wall Descriptions 20
4.7.5 Conclusions 20
4.8 WALL REPLACEMENT RECOMMENDATIONS 21
5. EARTHWORK 23
5.1 SUBGRADE PREPARATION 23
5.2 STRUCTURAL FILL AND COMPACTION 23
5.3 TEMPORARY EXCAVATIONS 23
5.4 PERMANENT SLOPES 24
5.5 WET WEATHER EARTHWORK 24
6. CONDITIONS AND LIMITATIONS 25
7. REFERENCES 27

List of Figures (Following Text)

Figure 1 Vicinity Map
Figure 2 Site and Exploration Plan

Appendices

Appendix A: Field Exploration

Figure A-1 Legend of Terms and Symbols Used on Exploration Logs
Figures A-2 – A-11 Logs of Boreholes BH-1 through BH-10

Appendix B: Laboratory Program

Figure B-1 Summary of Material Properties
Figures B-2 – B-4 Particle Size Analyses of Soils

Appendix C: Photos for Assessment of Rockery Conditions

Plate 1 to 20 Photos of Specific Wall Features

Appendix D: Environmental Laboratory Testing Results

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

GEOTECHNICAL REPORT
FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

1. INTRODUCTION

1.1 GENERAL

This report presents the results of a geotechnical study performed by HWA GeoSciences Inc. (HWA) for the new Fire Station 24 replacement facility. The purpose of this study was to evaluate the soil and groundwater conditions at the project area and to provide geotechnical recommendations for the design and construction of the facility.

Our work for this project included performing a site reconnaissance; preparing and conducting a subsurface investigation program consisting of drilled boreholes; performing laboratory testing on selected soil samples obtained from the boreholes; performing geotechnical engineering analyses; and providing recommendations for foundations, stormwater infiltration, earthwork, and evaluation of an existing rockery retaining wall at the site.

1.2 PROJECT DESCRIPTION

We understand that the project consists of construction of a new Fire Station 24, located in an existing retail lot, at 9820 NE 132nd Street in the Finn Hill / Juanita neighborhoods of Kirkland, Washington. The project will replace the existing Fire Station 24, located on 84th Avenue NE.

The new fire station is anticipated to be a single-story, at-grade structure with emergency vehicle bays. The project area is shown on the Vicinity Map, Figure 1. The locations of the drilled boreholes are shown on Figure 2, Site and Exploration Plan.

In addition to this report, separate investigations and testing have been, and will be, performed to assess groundwater fluctuations at the site and develop design infiltration rates for stormwater management. These results will be presented in separate letter reports.

1.3 SCOPE OF SERVICES AND AUTHORIZATION

Our scope of work was developed in coordination with the City of Kirkland. Our scope of work for this phase of the project included site reconnaissance, logging the drilling of 10 boreholes, evaluating potentially environmentally contaminated samples, performing geotechnical and environmental laboratory testing on selected soil samples, performing geotechnical engineering analyses, developing geotechnical design recommendations, and preparation of this report.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. FIELD AND LABORATORY TESTING

2.1 FIELD INVESTIGATION

The field investigation program included review of available geologic and geotechnical data for the project site, site reconnaissance, and logging the drilling of ten exploratory borings. The borings, designated BH-1 to BH-10, were drilled to depths of 26.5 feet below ground surface (bgs), except for BH-3, which was drilled to a depth of 36.5 feet bgs. The approximate locations of the boreholes are shown on the Site and Exploration Plan, Figure 2. The borings were performed as follows:

- Borings BH-1 and BH-2 were drilled on May 13, 2019 as part of an initial phase of work prior to the City obtaining entry to the actual project site and were located within a grass landscape strip just north of the sidewalk along NE 132nd Street, within the City of Kirkland right-of-way. These borings were drilled by Geologic Drill Partners of Bellevue, Washington, under subcontract to HWA, using hollow-stem-auger drilling techniques and a limited-access, Bobcat-mounted drill.

- Borings BH-3 to BH-10 were drilled within the asphalt-paved parking lot and distributed around the footprint of the new Fire Station 24 building and proposed infiltration locations. As shown on Figure 2, a portion of the proposed building footprint was occupied by a Rite-Aid building at the time of our investigation. These borings were drilled between August 14 and 16, 2019 by Holocene Drilling of Puyallup, Washington, under subcontract to HWA, using a truck-mounted drill rig and hollow stem auger drilling techniques.

Standard Penetration Test (SPT) sampling was performed at 2.5 to 5 feet intervals in each boring using a 2-inch outside diameter split-spoon sampler driven with a 140-pound automatic (BH-3 through BH-10) or rope and cathead (BH-1 and BH-2) hammer system. During the SPT, samples were obtained by driving the sampler 18 inches into the soil with the hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration were recorded. The Standard Penetration Resistance ("N-value") of the soil is taken to be the number of blows required for the final 12 inches of penetration. If a total of 50 blows or more were recorded within a single 6-inch interval, the test was terminated, and the N-value was recorded as 50 blows for the number of inches of penetration. The N-value, provides an indication of the relative density of the granular soils and the relative consistency of the cohesive soils. Upon completion, the boreholes were abandoned and backfilled with bentonite chips per Department of Ecology requirements.

The borings were completed under the full-time observation of a geotechnical engineer from HWA, who collected pertinent information including: soil sample depths, stratigraphy, soil engineering characteristics, and ground water occurrence as each exploration was advanced.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Soils were classified in general accordance with the classification system described in Figure A-1, which also provides a key to the exploration log symbols. The boring logs are presented on Figures A-2 through A-11.

The stratigraphic contacts shown on the individual logs represent the approximate boundaries between soil types. Actual transitions may be more gradual. The soil and ground water conditions depicted are only for the specific dates and locations reported, and therefore, are not necessarily representative of other locations and times.

According to information provided by the City of Kirkland, Shockey Planning Group is conducting a Phase I Environmental Site Assessment (ESA) on the Fire Station 24 property. However, this Phase I ESA was not completed prior to our site investigation. Information provided to HWA by the City of Kirkland indicates that a former orchard was located on the Fire Station 24 property, but the exact location of the orchard and specific chemicals, if any, that may have been previously utilized on the property were not known. Therefore, the samples collected during the geotechnical investigation were considered to be potentially contaminated and stored accordingly. Representative geoenvironmental soil samples were collected from each boring and submitted to OnSite Environmental Inc. in Redmond, Washington for chemical analyses. Geotechnical soil samples collected were taken to the HWA laboratory in Bothell, Washington for further examination and laboratory testing.

2.2 GEOTECHNICAL LABORATORY TESTING

Laboratory tests were conducted on selected samples retrieved from the explorations to characterize relevant engineering properties and index parameters of the soils encountered at the site. The tests included visual classification, natural moisture content determination, and grain size distribution analysis. The tests were conducted in general accordance with appropriate American Society of Testing and Materials (ASTM) standards and are discussed in further detail in Appendix B. The test results are also presented in Appendix B, and/or displayed on the exploration logs in Appendix A, as appropriate.

2.3 ENVIRONMENTAL LABORATORY TESTING

At the time of our subsurface investigation programs, the Shockey Planning Group Phase I ESA had not been completed due to limited site access. Therefore, contaminants of concern were chosen based on information provided to HWA by the City of Kirkland and these results do not account for any potential impacts that could become evident during completion of the Phase I ESA of the site. During the drilling of geotechnical borings BH-3 to BH-10, HWA personnel collected environmental soil samples at selected intervals between 0 and 10 feet bgs to address potential impacts from the site's previous agricultural uses. To prevent potential cross-contamination of samples, the drillers utilized clean augers for each of the borings. All sampling

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

equipment was decontaminated prior to use with detergent solution, potable water, and distilled water. The approximate borehole locations are shown on the Site and Exploration Plan, Figure 2.

Soil samples were field screened using a photoionization detector (PID). To field screen, a small amount of soil from a discrete depth was placed in a plastic bag, sealed, and permitted to sit at least two to three minutes prior to analyzing the vapor in the sample bag. The bag was then perforated by the PID sample tip to obtain the reading. Although the PID is not capable of quantifying or identifying specific organic compounds, it can measure the relative concentrations of a variety of organic vapors with ionization potentials less than the energy of the ultraviolet source (in this case, 10.6 eV). The PID is useful for providing qualitative information with respect to the presence and relative concentration of organic vapors. Soil cuttings and decontamination water from all drilling activities were placed in steel drums and stored at a City of Kirkland maintenance yard for future disposal pending laboratory results. No ground water samples were collected as part of the environmental investigation.

A composite environmental soil sample was collected from the 0 to 10 feet bgs soil cuttings from each boring (one sample per boring for a total of eight soil samples). Samples were placed in labeled laboratory-provided sample containers using nitrile gloves and then placed in a cooler with "blue ice" for transport to the laboratory under chain-of-custody protocol. Chemical analyses performed included:

- Organophosphorus pesticides using Environmental Protection Agency (EPA) method 8270D/SIM;
- Organochlorine pesticides using EPA method 8081B;
- Chlorinated acid herbicides using EPA method 8151A; and
- Metals (arsenic and lead) using EPA method 6010D.

None of the contaminates of concern were detected in any of the samples analyzed. The test results are presented in Appendix D.

Based on the analytical results of the soil samples submitted for analyses, the drummed soil cuttings may be disposed of at an unregulated fill site or inert waste landfill. However, disposal at these facilities may require additional analytical testing to meet the individual disposal facility criteria. The City of Kirkland may also opt to dispose of the soils at one of the City of Kirkland properties or utilize the soils as backfill (if deemed suitable). The drummed water could be discharged under permit to the City of Kirkland sanitary sewer. This option could also require additional analytical testing to meet the City's disposal requirements. HWA contacted Cascade Drilling regarding disposal costs of these drums and was informed that disposal of the soil and water drums would cost approximately $1,400 with disposal occurring at a Subtitle D Landfill.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. SITE CONDITIONS

3.1 SURFACE CONDITIONS

The parcel under investigation is located at 9820 NE 132nd Street in Kirkland, Washington. It is currently owned by Rite Aid. The primary building onsite is occupied by a Rite Aid business on the west side and connected to a Goodwill on the east side. The site is mostly flat with higher grades to the north and west outside of the property lines retained by rockery and concrete retaining walls. Except for the grassy strip where BH-1 and BH-2 were located and the existing building footprint, the entire site is paved with asphalt. Along the northern and western edge of the parcel, a rockery wall separates the parking lot from residential parcels above. The area within the lot to be developed into the new Fire Station 24 will be located directly in front of the existing Rite Aid, centered in the front lot. Preliminary plans indicate that the existing Rite Aid is to be demolished and replaced by a new infiltration pond.

3.2 GENERAL GEOLOGIC CONDITIONS

Geologic information for the project area was obtained from the *Geologic Map of the Kirkland Quadrangle* (Minard, J.P., 1983). This map indicates that the project site is located near mapped deposits of Vashon recessional glacial outwash (Qvr), Vashon advance glacial outwash (Qva), transitional beds (Qtb), and undifferentiated pre-Frasier till (Qtu). Geologic mapping is typically provided based on general boundaries between units that may have shifted with time and development of the Kirkland neighborhood; at a very fine local scale, the general nature of the geologic map referenced may not be accurate to conditions present in subsurface explorations and should only be taken as a guideline for regional deposits. The characteristics of units that we observed at the site are described in the following section.

This map indicates that the project alignment is positioned near the contact of Vashon recessional outwash soils and Vashon advance outwash soils. Deposits of Vashon recessional outwash generally consist of unsorted, slightly silty to silty sand. Recessional outwash was deposited by meltwater emanating from the retreating glacial ice sheet. Consequently, these deposits have not been overridden by glacial ice and are typically loose to medium dense. Advance outwash was deposited in a braided fluvial system as an alluvial sequence that issued from the front of an advancing glacier and was subsequently glacially-overridden. The overconsolidation and densification results in advance outwash deposits to typically be dense to very dense.

3.3 SUBSURFACE CONDITIONS

3.3.1 Soils

Our interpretations of subsurface conditions are based on a review of available geologic and geotechnical information for the project site, as well as our field explorations. In general, the

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

borings encountered loose to medium dense fill over medium dense recessional outwash. Brief descriptions of these soil units are presented below in order of deposition, beginning with the most recently deposited.

- **Fill** – Undocumented fill was observed in all borings, from the surface to depths of 5 to 10 feet bgs. Fill soils encountered typically consisted of medium dense, silty sand with varying amounts of gravel, scattered organics, rootlets and debris. The fill was likely placed during development of the lot and the adjacent residential developments.

- **Recessional Outwash** – Vashon-age recessional outwash was observed in all borings below the fill soils extending to the termination depth of each boring. Recessional outwash soils encountered typically consisted of medium dense to dense, silty to clean sand with occasional sandy silt layers/lenses. This material was deposited in braided outwash channels carrying meltwater away from the front margins of the receding glacier. Recessional outwash deposits are generally deemed liquefiable where saturated. In general, denser conditions were encountered as the borings extended to greater depths. The last sample in boring BH-1 may have encountered a different geologic unit but was not penetrated sufficiently to discern.

3.3.2 Groundwater

Groundwater was encountered in each boring at depths ranging from 11 to 18 feet bgs. In borings BH-1 and BH-2, located in the planter strip at the south end of the site, ground water levels were 17.9 feet and 17.3 feet bgs, respectively. In the remaining borings, ground water levels were between 11 feet and 15 feet. We anticipate that groundwater levels fluctuate somewhat during the year in response to rainfall. As part of a future phase of this this project, a groundwater monitoring well will be installed to evaluate levels over the winter months.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

The project site is underlain by a sequence of fill over recessional outwash soils. Based on the Site Plan and Floor Plan drawings provided by TCA Inc., it is our understanding that the development will consist of a single-story structure with an accompanying infiltration pond. The fire station structure will need to be designed for static loading, as well as the loads that are anticipated during a moderate to large seismic event. Our analyses indicate that portions of the saturated, medium dense recessional outwash soils could potentially liquefy during a design earthquake level event. The onset of liquefaction within these soils would result in some loss of strength and potential liquefaction-induced settlements at the ground surface.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.2 SEISMIC CONSIDERATIONS

4.2.1 Design Parameters

The contribution of potential earthquake-induced ground motion from known sources is included in the probabilistic ground motion maps developed by the USGS. Design seismic site characterization and design recommendations based on USGS mapping and analyses are implemented in the 2015 *International Building Code* (IBC, 2015). As part of this code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event as well as the properties of the soils that underlie the site.

The 2015 IBC requires above-grade structures be designed for the inertial forces induced by a "Maximum Considered Earthquake" (MCE), which corresponds to an earthquake with a 2% probability of exceedance (PE) in 50 years (approximately 2,475-year return period). The IBC accounts for the effects that site-specific subsurface ground conditions have on the response of structures in terms of site classes. Site classes are defined by the average density and stiffness of the soil profile underlying the site. The Site Class can be correlated to the average standard penetration resistance (N_{SPT}) in the upper 100 feet of the soil profile. The Site Class can then be determined in accordance with Section 20.3 of ASCE 7-10, and the corresponding values of Fa and Fv determined from Tables 11.4-1 and 11.4-2 of ASCE 7-10. In Section 11.4.8 of ASCE 7-10, it is stated that a site-specific ground motions hazard analysis is required on sites with seismically isolated structures and structures with dampening systems when S_1 is greater than or equal to 0.6. Provided these conditions do not pertain to the proposed structures, a site-specific hazard analysis is not required.

Based on our characterization of the subsurface conditions, the site class designation has been determined based on the principle that the consistency of the soils below the depth of the borings are consistent or denser than the 36.5 feet depth explored in the SPT borings. For this project, SPT blow counts obtained from our borings were utilized to classify the subject site as IBC Site Class C. Table 1 presents the design spectral seismic coefficients obtained for this site based on risk category I/II/III. Based on the S_{DS} and S_{D1} values, the site is considered as Seismic Design Category D.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Table 1: Design Seismic Coefficients for Evaluation Using 2014 USGS Seismic Design Maps with Modifications per ASCE 7-16 (Return period of 2,475-year)

Site Class	USGS Model	Peak Horizontal Ground Acceleration on Class B Rock PGA, (g)	Spectral Bedrock Acceleration at 0.2 sec S_s, (g)	Spectral Bedrock Acceleration at 1.0 sec S_1, (g)	Site Coefficients			Acceleration Coefficient A_s, (g)
					F_{pga}	F_a	F_v	
C	2014	0.504	1.253	0.484	1.000	1.000	1.316	0.504

4.2.2 Near Fault Ground Motion Considerations

The project site is located about 1.8 miles southwest of the Southern Whidbey Island Fault Zone (SWIFZ). The main seismic consideration for the site is the large amplitude of the ground motions associated with its close proximity to the fault, which is accounted for in the design seismic coefficients. As no long-period structures are being constructed (e.g. water reservoirs/tanks, earthen embankments, multi-span bridges), it is not necessary to consider other near fault effects, such as forward directivity, for the proposed improvements.

4.2.3 Liquefaction Susceptibility

Liquefaction is a temporary loss of soil shear strength due to earthquake shaking. Loose, saturated cohesionless soils are the most susceptible to earthquake-induced liquefaction; however, recent experience and research has shown that certain silts and low-plasticity clays are also susceptible. Primary factors controlling the development of liquefaction include the intensity and duration of strong ground motions, the characteristics of subsurface soils, in-situ stress conditions and the depth to ground water. Based on the *GDM* (WSDOT, 2018), the liquefaction susceptibility of the soils along the project alignment was determined utilizing the simplified procedure originally developed by Seed and Idriss (1971) and updated by Youd et al (2001) and Idriss and Boulanger (2004, 2006).

The simplified procedure is a semi-empirical approach which compares the cyclic resistance ratio (CRR) required to initiate liquefaction of the material to the cyclic shear stress ratio (CSR) induced by the design earthquake. The factor of safety relative to liquefaction is the ratio of the CRR to the CSR; where this ratio is computed to be less than one, the analysis would indicate that liquefaction is likely to occur during the design earthquake. The CRR is primarily dependent on soil density, with the current practice being to base it on the Standard Penetration Test (SPT) N-value, corrected for energy consideration, fines content and earthquake magnitude. CSR is generally determined by the formulation developed by Seed and Idriss (1971) and relates equivalent shear stress caused in the soil at any depth to the effective stress at that depth and the peak ground acceleration at the surface.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Our analyses indicate that, when saturated, the medium dense recessional outwash deposits are potentially liquefiable during the maximum considered earthquake. Upon the initiation of liquefaction, we expect that liquefiable soils will lose shear strength, undergo liquefaction-induced settlement, as discussed below.

4.2.4 Liquefaction Settlement Analysis

For liquefaction susceptible soil deposits, excess pore water pressure builds up during the earthquake excitation, leading to loss of strength, termed as liquefaction. After the shaking stops, excess pore water pressures dissipate toward a zone where water pressure is relatively lower, usually the ground surface. The dissipation is accompanied by a reconsolidation of the loose sand (Ishihara and Yoshimine, 1992 & Tokimatsu and Seed, 1987). The reconsolidation is manifested at the ground surface as vertical settlement, usually termed as liquefaction-induced settlement or seismic settlement.

Based on our analysis of the soils encountered during our investigation, liquefaction-induced settlements on the order of approximately 0.2 to 1.6 inches during the design seismic event are predicted to occur. These settlements could be differential, and we anticipate that differential settlement across the proposed structure footprint would be about half of the total settlement value.

4.3 FIRE STATION FOUNDATION DESIGN

The proposed structure is underlain by about 5 to 10 feet of medium dense, silty sand fill soils, which are underlain by medium dense to dense, silty to clean sand (recessional outwash). Groundwater was encountered at depths between 11 and 18 feet at the time of drilling, within the recessional outwash deposit. These soils, when saturated, may be susceptible to minor liquefaction-induced settlements, as indicated above. In our opinion, the new structure could be founded on conventional, shallow spread footings, provided the minor magnitudes of potential settlement, discussed in Section 4.2.4, could be tolerated.

If these magnitudes of settlement cannot be tolerated, consideration could be given to using small diameter, driven pipe piles (pin piles), Rammed Aggregate Piers (RAP), or construction of a mat slab. The usage of pin piles or RAP would involve placement of these elements beneath conventional, shallow spread footings and these systems would effectively reduce the magnitude of settlement by transferring the building load to the denser soils at depth. The use of a mat foundation would allow for tolerance of larger magnitudes of differential settlement with less risk of structural damage.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.3.1 Spread Footing Foundations

We anticipate that excavations for shallow foundations will encounter medium dense, silty sand fill soils. Properly installed footings may be designed for a net allowable bearing capacity of 2,000 pounds per square foot (psf). This applies to dead plus live loads and may be increased by 33 percent for short-term wind and seismic loading conditions.

Continuous (wall) footings should have a minimum width of 18 inches. Column footings should have a minimum width of 24 inches. Perimeter footings should bear at least 18 inches below the lowest adjacent finished grade, for frost protection considerations, and interior footings should be founded at least 12 inches below the finished floor level.

4.3.2 Spread Footing Construction

For footings placed below existing grade, any loose soil in the excavation base should be carefully removed to expose undisturbed native materials of suitable density. A smooth edge (toothless) bucket should be employed on excavator equipment to minimize foundation base disturbance. Minor amounts of loose material in the base may be compacted to a uniform density of not less than 95% of the maximum dry density per ASTM D1557 (modified Proctor) for the material. If disturbance is excessive, over-excavation should be performed to remove it and the footings thickened accordingly to replace the excavated soils. A representative of our firm should observe all footing excavations and verify that the appropriate bearing stratum is exposed and is suitably prepared. Although wet weather construction is not recommended for foundation elements, a thin skin coat of lean concrete should be placed after inspection and approval to protect exposed foundation bases if wet weather conditions are anticipated.

4.3.3 Design for Closed-ended Pipe Piles

In our opinion, 3-inch or 4-inch diameter, schedule 80 (extra strong), galvanized steel pipe piles (pin piles) driven sufficiently into the medium dense to dense recessional outwash deposits (below about 15 to 20 feet) can support allowable compressive loads of 6 tons and 10 tons each, respectively, with an acceptable factor of safety.

Three- to four-inch diameter pin piles are typically installed using an impact hammer operating on the boom of an excavator or articulating forklift. Pin piles should be driven into the medium dense to dense, recessional outwash soils a sufficient depth to meet practical refusal. For 3-inch diameter piles, we recommend an 1,100-pound hammer be used for diving, while the 4-inch diameter piles should be driven with either an 1,100-pound or 2,700-pound hammer. A refusal criterion of less than 1 inch of penetration in 6 seconds should be used for the 3-inch diameter piles driven with an 1,100-pound hammer. A refusal criterion of less than 1 inch of penetration in 10 and 4 seconds should be used for 4-inch diameter piles driven with an 1,100-pound and 2,700-pound hammer, respectively. We anticipate pile lengths of about 20 to 40 feet will be

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

required; however, lengths could vary considerably from this estimate. We recommend center to center pile spacing of 6 foot or less. The piles should be closed-ended.

We should be contacted to review the proposed pin pile hammer and installation equipment, and to provide appropriate driving criteria. A geotechnical engineer should be on site during pile driving for all of the pin piles. Additionally, 3 percent of the total number of piles driven, for a minimum of 1 to a maximum of 5 piles, should be load tested in accordance with the Quick Load Test Method described in ASTM Standard D1143 Standard Test Methods for Deep Foundations Under Static Axial Compressive Load.

There is a possibility that gravel, cobbles, or other obstructions exist in the surficial fill soils or the underlying recessional outwash soils. If an obstruction is encountered within 15 feet bgs that cannot be penetrated, the pin pile should either be removed or abandoned in place and a new pin pile should be installed about 12 inches away from the pile that hit the obstruction.

Typically, the steel pipe piles will be delivered to the site in 21-foot (maximum) lengths. Pin connections are typically used to splice sections of pipe together during installation. We recommend the uplift capacity of the pin piles be neglected, unless splice connections are structurally designed and welded in the field during construction.

An allowable lateral capacity of 1,000 pounds per pile may be assumed for 3- and 4-inch pin piles installed at this site per these recommendations, respectively. A lateral deflection of ¼-inch at the top of the pin pile should be assumed under these lateral loads. If larger lateral capacities are needed, the pin piles may be battered at a maximum of 1H:4V.

4.3.4 Rammed Aggregate Piers (RAP)

Based on our evaluation, it is our opinion that the proposed structure can be supported on conventional, shallow spread footing foundations bearing on a RAP system, which will be designed by the installer. Based on subsurface conditions encountered in the borings, we anticipate pier lengths of about 20 to 40 feet bgs. In discussions with Geopier NW, a rammed aggregate pier contractor, we understand that a net allowable bearing capacity of 5,000 psf can be used after installation of the piers. This applies to dead plus live loads and may be increased by 33 percent for short-term wind and seismic loading conditions.

If the usage of Rammed Aggregate Piers is selected, we recommend that any structural fill be placed to design grade prior to construction of the system and that the piers be installed through the existing fill to reach dense, glacially-consolidated soils. Geopier NW recommends that new fill consist of silty sand with angular (non-round) gravel and indicated that Crushed Surfacing Base Course (CSBC), as described in Section 9-03.9(3) of the WSDOT Standard Specifications (WSDOT, 2018) would be adequate. Alternatively, another proposed material could be submitted to the rammed aggregate pier contractor for approval.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.3.5 Mat Foundation

Another foundation option, if liquefaction-induced settlements are not tolerable for spread footings, is a mat foundation. We recommend a modulus of subgrade reaction of 150 psi/in be used for design if this option is selected. The mat foundation should bear at least 18 inches below the lowest adjacent finished grade for frost protection considerations.

4.3.6 Drainage

Subsurface drains, consisting of 4-inch minimum diameter perforated pipe, should be installed around the perimeter of building footings and should be founded at or below the level of the bottom of the footing. Washed drain rock should be placed such that a minimum of 6-inches of drain rock envelops the drain pipe around its perimeter. Roof drain downspouts should not be hydraulically connected to the footing drains, to prevent potential clogging and flooding of the drain system. All drains should be sloped to drain and tightlined to appropriate storm drainage outlets.

4.3.7 Resistance to Lateral Loads

Lateral forces will be resisted by passive earth pressure against buried portions of structures and by friction against the bottom of footings and slabs. Passive earth pressures in backfill should be estimated using an equivalent fluid pressure of 260 and 220 pcf, for static and seismic loading conditions, respectively, and backfill above the design water table. These values assume that the backfill around the structure is compacted structural fill and that foundations extend at least 18 inches below the lowest adjacent grade. For base sliding friction, we recommend a coefficient of 0.5 between cast-in-place concrete and soil. The passive earth pressures employ a factor of safety of 1.5, to preclude excessive deformation associated with development of passive conditions.

4.3.8 Lateral Earth Pressures

A moist soil unit weight of 120 pcf should be assumed for design along with a buoyant (below water table) unit weight of 57.6 pcf (not including weight of water). For design of any soil retaining elements for the structure, earth pressures should be assigned based on the amount of deflection at is allowed at the top of the wall. Where the walls are able to deflect at least 0.001H, where H is the height of the wall, the walls are considered yielding and can be designed for active pressures. Otherwise the walls should be considered non-yielding and should designed for at-rest conditions. Under seismic loading, non-yielding walls are assumed to experience yielding conditions.

Lateral earth pressures against unrestrained retaining structures should be estimated by an equivalent fluid pressure of 40 pcf and 65 pcf, for static and seismic loading conditions, respectively. For restrained retaining structures, an equivalent fluid pressure of 60 pcf for static

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

loading conditions should be employed. In the case of a restrained retaining structure under seismic loading conditions, active conditions should be anticipated to develop and should be estimated with an equivalent fluid pressure of 65 pcf. These values assume there is adequate drainage provided so hydrostatic pressures do not build up behind the walls. For submerged structures, an equivalent fluid pressure of 29 pcf should be used for static conditions and 32 pcf should be used for seismic conditions, neither of which includes pressure from water.

4.3.9 Slab-On-Grade

Slab-on-grade structures should be supported on a minimum of 1-foot of structural fill placed directly over the compacted undocumented fill or native soils. Any loose or disturbed soils and any soil containing organic material (unsuitable material) should be removed under the observation of an HWA engineer or geo-technician to verify competent native soils are exposed and backfilled with properly-compacted structural fill. For slab-on-grade design, we recommend a modulus of subgrade reaction value of 300 pounds per cubic inch (pci) be used.

We recommend the floor slabs be underlain by a 6-inch minimum thickness of 3/8-inch washed pea gravel, drain rock, or other open-graded gravel material to serve as a capillary break. The capillary break layer should be placed on properly prepared native subgrade soils or additional structural fill. A vapor barrier consisting of 10-mil minimum thickness plastic sheeting should be placed over the capillary break layer.

4.4 Onsite Infiltration Pond

We have performed a stormwater infiltration feasibility study, based upon multiple boreholes and selected samples at anticipated infiltration facility receptor depths. We evaluated the less permeable (higher fines content) soils encountered in borehole BH-1 and the two boreholes within the vicinity of the proposed infiltration pond (borings BH-3 & BH-4) using laboratory grain size analyses. For the siltier soils evaluated, sample S-3 at 7.5 feet bgs in boring BH-1 (consisting of SM, very silty sand), we calculated a preliminary long-term (design) infiltration rate of 1.3 in/hr. For the sandier soils encountered at in samples S-2 at 5 feet bgs in borings BH-3 & BH-4, we determined a preliminary long-term (design) infiltration rate of 8 and 5 in/hr, respectively. These rates were determined in accordance with Section V-5.4 of the Washington State Department of Ecology *Stormwater Management Manual for Western Washington* (DOE, 2019). We applied correction factors per the grain-size method. Table 2 presents the summary of our results and the grain size distribution encountered at each site.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Table 2. Design Infiltration Rates for Native Soils

Boring		BH-1	BH-3	BH-4
Depth	ft	7.5	5	5
USCS Classification		SM	SP-SM	SM
Correction Factor		0.18	0.18	0.18
D10	mm	0.005	0.13	0.058
D60	mm	0.25	0.45	0.45
D90	mm	0.8	0.52	0.75
f_{fines}	%	0.357	0.086	0.122
K_{sat}	in/hr	6.95	44.62	27.22
	cm/s	0.005	0.031	0.019
K_{design}	in/hr	1.25	8.03	4.90
	cm/s	0.0009	0.0057	0.0035

Estimation of infiltration rates based on grain size distribution can often vary greatly as a result of changes in encountered soil conditions. Furthermore, it should be noted that the utilization of grain size analysis for determining infiltration rates is not accepted per the King County manual and this result is only to be used for preliminary planning. In our experience, this method often results in overestimating rates for silty soils, and overly conservative rates for clean granular soils.

Per the City of Kirkland Addendum to the 2016 King County *Surface Water Design Manual* (King County, 2016), small-scale Pilot Infiltration Test (PIT) or EPA Falling Head test methods are acceptable for an infiltration facility serving less than 1 acre of impervious area. For greater than 1 acre of impervious surface, only the large-scale PIT method is acceptable. A series of EPA Falling Head tests along with a PIT will be conducted on site to more accurately determine the hydraulic conductivity of the proposed infiltration facility. The results of the additional infiltration testing and groundwater monitoring will be presented in separate reports.

The presence of a shallow groundwater table or relatively impermeable layer would likely result in groundwater perching, and therefore mounding. A mounding analysis would be required for more than 1 acre of impervious surface if the groundwater table or a potential perching condition is found less than 15 feet below receptor depth. While a medium dense, sandy silt (ML) layer was encountered below 15 feet in BH-1, a similarly impermeable layer was not encountered within any of the borings adjacent to the location of the proposed infiltration pond; however, groundwater level may be within 15 feet of the bottom of the facility and may require a mounding analysis.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.5 PAVEMENT DESIGN

It is our understanding that the site will be paved with a combination of flexible and rigid pavement sections. Plans provided to us by TCA Architecture, dated August 30, 2019, show a front and rear concrete apron adjacent to the proposed fire station. An asphalt pavement road appears to run the perimeter of the site facilitating the passage of Goodwill trucks as well as allowing access to the rear concrete apron for firefighter personnel and fire trucks. As a result, the recommended minimum structural pavement design thicknesses presented below are based on an assumed traffic frequency including fire trucks and fully loaded tractor semi-trailer trucks.

4.5.1 Flexible Pavement Sections

The following table presents HMA design recommendations for the new asphalt pavement structure. Our HMA pavement design is based on the design method given in the 1993 AASHTO Design Guide (AASHTO, 1993) for low-volume roads, using the following parameters:

- Reliability = 75%
- Relative Quality of Roadbed Soil = Fair
- U.S. Climatic Region = II
- Traffic Level = High (700,000 to 1,00,000 ESALs)

Based on these input parameters, the recommended Structural Number (SN) ranges from 2.9 to 3.2. Our design is based on a required SN value of 3.2 and is presented in Table 3.

Table 3. Structure Requirements for New HMA Pavement

Material Description	Minimum Layer Thickness, inches	WSDOT Standard Specification
HMA	6	5-04 & 9-02.1
CSBC	4	9-03.9(3)
Prepared Subgrade/Structural Fill	Proof roll/structural fill as required	9-03.14(1)

HMA: Hot Mix Asphalt

CSBC: Crushed Surfacing Base Course, compacted as specified.

Recommendations presented in Sections 5.1 and 5.2 for subgrade preparation and structural fill should be followed.

The pavement will likely require a functional overlay after about 10 to 12 years because of non-structural associated distress caused by environmental factors such as degradation of the asphalt surface.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

The selection of the optimum asphalt binder type for prevailing climatic conditions is critical to ensure long-term pavement performance. Use of the wrong binder can result in low temperature cracking or permanent deformation at high temperatures. Based on the climate and WSDOT recommendations, Superpave Performance Grade binder PG 58H-22 should be used.

Placement of HMA should be in accordance with Section 5-04 of the WSDOT *Standard Specifications* (WSDOT, 2018). Attention should be paid to the following:

- HMA should not be placed until the engineer has accepted the previously constructed subgrade and pavement layers.
- HMA should not be placed on any frozen or wet surface.
- HMA should not be placed when precipitation is anticipated before the pavement can be compacted, or before any other weather conditions which could prevent proper handling and compaction of HMA.
- HMA should not be placed when the average surface temperatures are less than 45° F.
- HMA temperature behind the paver should be more than 240 °F. Compaction should be completed before the mix temperature drops below 180 °F. Comprehensive temperature records should be kept during the HMA placement.
- For cold joints, tack coat should be applied to the edge to be joined and the paver screed should be set to overlap the first mat by 1 to 2 inches.

For HMA pavement that will only support general passenger vehicles, such as the visitor parking area, the HMA layer can be reduced to 4 inches.

4.5.2 Rigid Pavement Section

Using the traffic loading and soil subgrade parameters described above, and AASHTO guidelines, we completed analyses for rigid (Portland cement concrete) pavement design, assuming 1,000,000 ESALs and a modulus of subgrade reaction of 150 psi/in.

Table 4 provides our PCC pavement design recommendations. This pavement design is based on the design method given in the 1993 AASHTO Design Guide (AASHTO, 1993) using the following parameters:

- Reliability = 90%
- Initial Serviceability = 4.5
- Terminal Serviceability = 3.0
- Overall Standard Deviation = 0.4
- Modulus of Rupture = 600 psi

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

- Elastic Modulus = 4,000,000 psi
- Load Transfer Coefficient = 3.2
- Drainage Coefficient = 1.0
- Edge Support = 1.0
- Slab/Base Friction Coefficient = 1.4

Table 5. Structure Requirements for New PCC Pavement

Material Description	Minimum Layer Thickness (inches)
PCCP	9
CSBC	6

The exposed subgrade should be thoroughly compacted and proof-rolled prior to placement of CSBC. Transverse joints should be doweled using 1.25-inch diameter dowel bars, 18 inches long, on 12-inch centers, at mid-depth of the slab. Longitudinal joints should be tied using 5/8-inch diameter bars, 30 inches long, on 36-inch centers, at mid-depth of the slab. We recommend No. 4 bars be placed at 18 inches on center in both directions. Sawed joints should be sealed. Maximum joint spacing should be 15 feet or less.

4.6 SIGNAL POLE & LUMINAIRE FOUNDATIONS

We understand that the project will include installation of new traffic signals and potentially luminaires. Based on Table 17-2 of the *Geotechnical Design Manual* (WSDOT, 2019), we estimate the average allowable lateral bearing pressure for the soils encountered in the upper 8 feet to be 1,500 psf, based on an average SPT N-value of 10.

The shaft contractor should be prepared to handle cobbles and boulders and use temporary casing to prevent sidewall collapse.

Drilled shaft bottoms should be cleaned to the extent practical using appropriate methods. If more than 12 inches of water are present in the shaft, concrete should be placed by the tremie method into the shafts. Temporary casing should be withdrawn such that the level of concrete is maintained above the bottom of the casing at all times and at such elevations to counteract any potential hydrostatic effects associated with ground water conditions that may be present at the location of the work.

The luminaire pole shaft locations should also be evaluated to confirm that the proposed excavations do not conflict with existing utilities.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.7 ROCKERY CONDITION ASSESSMENT

4.7.1 Introduction

Rockeries have long been common landscaping and erosion control features in the Pacific Northwest. Rockery construction is a craft and depends largely on the skill and experience of the builder. A rockery is a protective system which helps retard the weathering and erosion process acting on an exposed cut or fill soil face. While by its nature (the mass, size and shape of the rocks) it will provide some undetermined degree of retention, it is not a designed or engineered system in the sense that a reinforced concrete retaining wall would be. The degree of retention achieved is dependent on the size of rock used, and the height of the wall being constructed. Proper rockery installation and maintenance are key to their long-term stability and safety.

The site currently contains two rockeries running along the western and northern property lines constructed to face cut slopes to the north and west of the property. The western wall is approximately 375 feet long and ranges in height from 2.5 feet on the south side to nearly 15 feet at the northwest corner of the property. The southern 125 feet consist of a single row of rocks and was not inspected in our investigation. The northern wall is approximately 525 feet and ranges in height from approximately 4 feet on the east side to nearly 16 feet at the northwest corner of the property. The section of the wall behind the existing Goodwill property was outside the scope of this study and was not inspected in our investigation; as a result, only the western 250 feet of wall section was evaluated for this report.

A short concrete retaining wall exists below the rockery wall along a portion of the western wall and along the entire section of the northern wall within our study area; this wall ranged in height from approximately 2 feet to 4.75 feet in height (Plate 1). The rockery is constructed directly above this retaining structure and it is assumed to have been constructed at the same time.

We understand that the walls were constructed between 1968 and 1973. A number of shrubs and trees are observed in the soil immediately above the rockery, which also has a fence installed separating the area from the back yards of the adjacent apartment complexes and residential developments. A bark lined trail runs behind the western rockery separating the apartment complexes and a portion of roadway for 98th Ave NE runs behind the northern wall.

4.7.2 Evaluation Program

The evaluation program consisted of the systematic measurement of the rockery height, batter, dimensions, and hardness of individual rocks in vertical sections every 50 linear feet along the rockery. In addition, qualitative rockery conditions were noted including; rock distress, zones of apparent rock movement, void space, seepage zones, loose rocks, drainage system, etc. We also assessed the area above and behind the rockery, including nearby water runoff sources. Subsurface explorations and slope stability analyses were beyond the scope of this wall condition inspection.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4.7.3 Rockery Conditions

The details pertaining to drainage and construction of the rockery wall are unknown, but it appears that crushed rock backfill was placed behind the wall to facilitate drainage. There does not appear to be any drain installed at the toe of the rockery to facilitate drainage. The separation behind the wall from any pertinent structures was outside of our investigation due to property limits but appears to be greater than 16 feet, or the maximum height of the rockery.

Both the western and northern walls appear to be heavily impacted by vegetation. Numerous trees were observed growing at the top of the rockery wall (Plate 2) and at the toe of the rockery wall (Plate 3) with root growth interwoven with the rocks and backfill material. The aggressive root system also appears to have displaced and dislodged multiple rocks (Plate 4). Significant overgrowth of shrubbery and brush was also observed, obscuring the face and limiting the effectiveness of the backfill drainage system (Plate 5).

The wall face batter ranges from 2V:1H (Vertical to Horizontal) to nearly vertical and appears to be on average a 3V:1H slope (Plate 6 and 7). The crushed rock backfill material prohibited probing between rocks to determine the cut face distance from the face of the wall. A number of rocks were aligned with the long axis of the rocks placed parallel to the face of the wall (Plate 8); per guidelines set forth by the Associated Rockery Contractors (ARC) guidelines, all rocks should be placed with their long axis perpendicular to the wall face.

Rockeries should be constructed with rocks stacked so that the largest rocks are used in the base row and smaller rocks used in successive rows above. This was observed to have not been followed at numerous locations and rock sizes appear to be randomly variable across the rock face (Plate 9). Continuous joint planes were observed at multiple locations extending as many as 4 rows of rock in both the vertical and horizontal orientations; per ARC guidelines, continuous joint planes should be avoided wherever possible (Plate 4). This prevents point loads from forming directly on existing rock faces and failure planes from developing.

Probing at the base of the rocks indicated that the bottom row was not embedded a significant distance, with at most 9 inches of loose topsoil material acting as embedment soils. Probing in the grass strip in front of the wall toe along the western wall indicated that the soils became firm at a depth of about 6 inches, suggesting that the bottom row of the rock wall is likely keyed into a gravel base. Stacked rocks were generally placed such that two rocks from a lower row were used to support a rock above (i.e., similar to bricks), per guidelines, though numerous discrepancies were observed (Plate 10). The void space behind the wall appears to have been backfilled using 1- to 2-inch quarry spalls, though root growth was observed throughout the backfill material (Plate 11).

Openings and cracks in the face of the rockery wall that were larger than 6 inches in diameter were sometimes “chinked” (filled) with smaller pieces of crushed rock, per ARC guidelines. A

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

majority of the chinking appeared to be placed from the front, which is not recommended as the chinking is not held in place and can fall out (Plate 12). This was observed at numerous locations where rockfall appeared to be evident and large voids were observed (Plate 13). Significant quantities of sediment were observed to be eroding through the rocks.

In general, the rockeries appear to have been constructed using minorly weathered, moderately strong, dark gray, andesite rock. The rock is massive and occasionally contained discontinuities. When discontinuities were apparent, the features appeared to consist of tight, planar, relatively closely spaced (2 to 6-inches apart), chlorite coated, shear joints. Typically, the mass strength of rocks containing this type of discontinuity is less than what would be expected for massive rock. Multiple rocks were observed to be heavily weathered and cracking. These rocks are at risk of failure and may result in rockfall if left unaddressed (Plates 14 and 15).

4.7.4 Concrete Retaining Wall Descriptions

The details pertaining to construction and drainage of the short concrete retaining wall below the rockery are also unknown. Two weep holes were observed in the base of the retaining wall near the highest portion of the rockery; these holes appear to have been installed after the construction of the wall given the orientation and location relative to the formwork (Plates 16 and 17). These holes also appear to have been installed in the locations of observable seepage where the wall heights are the greatest at the northwestern corner of the property. Cracking running the height of the wall was observed at multiple locations and appears to be the result of bulging due to pore pressure buildup behind the face of the wall (Plate 18). This would suggest that drainage is insufficient behind the retaining wall. Furthermore, seepage was observed beneath the base of the concrete retaining wall in numerous locations where no weep hole had been drilled and cracking was not directly evident (Plate 19). This would suggest that the concrete retaining wall is not adequately embedded to mitigate the migration of water beneath the wall and a significant fluid head has developed behind the wall leading to the presence of seepage.

The overlying rockery wall on the western wall was observed to overhang the concrete retaining wall suggesting that the base row of rocks was not embedded or keyed into any dense soils (Plate 20). The northern rockery wall was set back from the face of the concrete retaining wall by approximately 1 foot; embedment and base material were difficult to assess.

4.7.5 Conclusions

Based upon our evaluation of the rockery, our conclusions are as follows:

1. In general, while the size of the rocks used to construct the rockery appear to be adequate for the height when compared with local industry standards (per WSDOT 2016 Standard Specifications, Section 8-24.3(1) E), the placement of rocks does not follow the

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

guidelines suggesting the largest rocks to be at the base of the rock with decreasing size up the height of the wall.

2. The rockery was not built with face inclinations (batter) generally in conformance with the industry standard of 6V:1H, with average face inclinations of 3V:1H and multiple locations in which vertical inclinations are observed.

3. The workmanship is poor. In general, the rocks were placed with intent to create a tight interlocking mass but many of the modern guidelines for construction of rockery walls were not followed. This is likely due to the era in which the wall was constructed.

4. The behind-rockery drainage system (length unknown) does not appear to be functioning. Seepage behind the rockery wall and concrete retaining wall suggesting significant pore pressure head is present and may contribute to the instability of the wall.

5. In general, the rock quality is below the average industry standard, with regard to rock shape and the presence and type of discontinuities they typically contain.

6. Hazard exists for rock movement and disintegration. Active rockfall has been observed on the site and safety considerations should be made for any personnel working nearby the wall and for any construction planned within the vicinity of the wall.

4.8 WALL REPLACEMENT RECOMMENDATIONS

Although the rockeries do not appear to be in danger of catastrophic failure, it is evident that rocks have been dislodged and fallen out of place in numerous locations. In our opinion, the existing rockeries are beyond their useful life and should be replaced with either newly constructed rockeries or another type of retaining wall, such as a Soldier Pile and Lagging retaining wall or a Structural Earth Wall (SEW) system. A description of the benefits and drawbacks of each potentially suitable approach are presented below. Regardless of what option is selected, we recommend removal of the large trees and brush behind the walls whose roots may impact the walls. Planting of fast-growing trees with aggressive root systems should not be allowed behind the newly designed wall.

New Rockery Wall: A new rockery wall can be constructed in place of the existing rockery wall system. Given the condition of the existing rockery wall, construction of a new rockery wall in accordance with modern design practices will likely provide suitable erosional resistance for the slope. While rockery walls provide suitable erosional resistance, these structures are not denoted as retaining structures. Adequate drainage should be included in design and directed to an appropriate outlet.

Cantilevered Soldier Pile Wall with Lagging: Soldier pile and lagging walls are typically constructed with 10- to 12-inch diameter drilled shafts spaced 6 to 8 feet apart

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

along the wall alignment. Steel H-piles are placed in vertical drilled holes and the holes are backfilled with lean concrete. Excavation is made on the downslope side of the wall and lagging is installed between the flanges of the piles as the excavation proceeds. Lean concrete must be chipped away to allow lagging installation. Lagging can consist of treated timber (typically 4 x 12 timber beams), precast concrete panels or shotcrete. Where shotcrete is used, the shotcrete should be applied as the excavation is made, so that no more than 4 or 5 vertical feet of the exposed soil between piles is open at a time. Drainage mat and steel reinforcing should be placed between soldier piles before application of the shotcrete. A drainage mat such as Miradrain 6200 should be placed behind the lagging between all soldier piles to facilitate drainage and prevent hydrostatic pressures from acting on the wall. The drainage mats should be placed such that flow of intercepted water is continuous to the bottom of the wall. The water flowing down the drainage mat should be collected in a pipe and conveyed via tightline to the stream bed.

Design of this type of wall would require additional explorations be performed above and behind the wall to provide information for determining lateral earth pressures to be used in design. Additionally, this wall type is likely to be the most expensive.

Structural Earth Wall (SEW): SEW, sometimes referred to as Mechanically Stabilized Earth (MSE) Walls, typically consist of pre-cast concrete members (panels or blocks) used as facing elements in conjunction with a reinforcing element placed in lifts behind the wall in order to provide adequate lateral resistance. Commonly used reinforcing elements include steel strips and various geosynthetic products such as geogrid and geotextile sheets. Many SEW systems are available as proprietary wall systems and will be individually designed by the wall manufacturer based on geotechnical design parameters provided. Similar to the soldier pile wall system, determination of these geotechnical design parameters may require additional investigations above and behind the wall face. Principal advantages of SEW systems include relatively low unit cost and tolerance of relatively large differential settlements.

While SEW systems may prove to be suitable to support the anticipated lateral earth pressures, construction of this system may be prohibitive given the proposed developments. Installation of the reinforcing elements typically extend behind the wall face a distance of approximately 0.7 to 1.0 times the wall height. Given the location of the existing rockery wall and the adjacent property line, installation of an SEW system would require moving the extents of the wall face further away from the property line. This would limit the allowable development space.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

5. EARTHWORK

5.1 SUBGRADE PREPARATION

In all areas of proposed improvements, subgrade preparation should begin with the removal of all existing pavement, topsoil, debris and vegetation. Using a smooth (toothless) bucket, the soils should be excavated to the design elevation. Based on the results of the subsurface explorations, medium dense, silty sand soils are typically expected. The exposed subgrade soils should be thoroughly compacted and proof-rolled using a fully-loaded dump truck, or similar heavy equipment, under the observation of the geotechnical engineer, or qualified earthworks inspector. If soft or otherwise unsuitable soils with deleterious material are encountered, they should be over-excavated per the geotechnical engineer and backfilled using Structural Fill per the recommendations in the following section.

5.2 STRUCTURAL FILL AND COMPACTION

The existing onsite soils consist predominately of silty sand and are considered to be moisture-sensitive and will be unworkable when wet. As such, we do not recommend they be reused as structural fill. We recommend that imported structural fill for this project consist of clean, free-draining, granular soils free from organic matter or other deleterious materials. The structural fill material should be less than 4 inches in maximum particle dimension, with less than 7 percent fines (portion passing the U. S. Standard No. 200 sieve), as specified for "Gravel Borrow" in Section 9-03.14(1) of the WSDOT *Standard Specifications* (WSDOT, 2018). The fine-grained portion of structural fill soils should be non-plastic.

We recommended that structural fill soils be placed in loose lifts no thicker than 8 inches and each lift properly moisture conditioned and compacted to at least 95 percent of its modified Proctor maximum density (ASTM D-1557). The procedure to achieve proper density of compacted fill depends on the size and type of compaction equipment, the number of passes, thickness of the layer being compacted, and soil moisture-density properties.

In areas where limited space restricts the use of heavy equipment, smaller equipment can be used, but the soil must be placed in thin enough layers to achieve the required relative compaction. Generally, loosely compacted soils result from poor construction technique and/or improper moisture content. Soils with high fines contents are particularly susceptible to becoming too wet, and coarse-grained materials easily become too dry, for proper compaction.

5.3 TEMPORARY EXCAVATIONS

Excavations for utility trenches can be accomplished with conventional excavating equipment such as backhoes/trackhoes. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. In accordance with Part N of

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Washington Administrative Code (WAC) 296-155, latest revisions, all temporary cuts in excess of 4 feet in height must be either sloped or shored prior to entry by personnel.

Fill and recessional outwash deposits generally classify as Type C Soils per WAC 296-155. Where no temporary shoring is used, excavations in Type C Soil should be sloped no steeper than 1.5H:1V (horizontal:vertical). Flatter slopes will be required where ground water seepage exists.

The contractor should be responsible for control of ground and surface water and should employ sloping, slope protection, ditching, sumps, dewatering, and other measures as necessary to prevent sloughing of soils.

5.4 PERMANENT SLOPES

We recommend all permanent slopes on site be graded to 3H:1V (horizontal:vertical) or flatter. Slopes should be vegetated to minimize erosion.

5.5 WET WEATHER EARTHWORK

The onsite soils are considered to be moisture susceptible and will be unworkable when wet. We recommend earthwork actives be performed during the dry summer months. General recommendations relative to earthwork performed in wet weather or in wet conditions are presented below. These recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation of unsuitable and/or softened soil should be followed promptly by placement and compaction of clean structural fill. The size and type of construction equipment used may need to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic.

- Material used as excavation backfill in wet weather should consist of clean granular soil with less than 5 percent passing the U.S. No. 200 sieve, based on wet sieving the fraction passing the ¾-inch sieve. The fines should be non-plastic. It should be noted this is an additional restriction on the structural fill materials specified.

- The ground surface within the construction area should be graded to promote surface water run-off and to prevent ponding.

- Within the construction area, the ground surface should be sealed on completion of each shift by a smooth drum vibratory roller, or equivalent, and under no circumstances should soil be left uncompacted and exposed to moisture infiltration.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

- Excavation and placement of backfill materials should be monitored by a geotechnical engineer experienced in wet weather earthwork to determine that the work is being accomplished in accordance with the project specifications and the recommendations contained herein.

6. CONDITIONS AND LIMITATIONS

We have prepared this report for the City of Kirkland for use in design and construction of this project. The conclusions and interpretations presented in this report should not be construed as our warranty of subsurface conditions at the site. Experience has shown that soil and ground water conditions can vary significantly over small distances and with time. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study of this scope and nature.

Within the limitations of approved scope, schedule and budget, HWA attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, express or implied, is made.

HWA does not practice or consult in the field of safety engineering. We do not direct the contractor's operations and cannot be responsible for the safety of personnel other than our own on the site. As such, the safety of others is the responsibility of the contractor. However, the contractor should notify the owner if any of the recommended actions presented herein are considered unsafe.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

June 8, 2020
HWA Project No. 2018-057-21

We appreciate the opportunity to provide geotechnical services on this project. Should you have any questions or comments, or if we may be of further service, please do not hesitate to call.

Sincerely,

HWA GEOSCIENCES INC.

Bryan Hawkins, P.E.
Senior Geotechnical Engineer

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

7. REFERENCES

Idriss, I. M., and Boulanger, R. W., 2008, *Soil Liquefaction During Earthquakes*, Earthquake Engineering Research Institute (EERI), MNO-12, 226 pp.

Idriss, I.M, and Boulanger, RW, 2004, *Semi-Empirical Procedures for Evaluating Liquefaction Potential During Earthquakes*, presented at the Joint 11th ISCDEE & 3rd ICEGE, January 2004.

Idriss, I.M., and Boulanger, R.W., 2006, "Semi-empirical procedures for evaluating liquefaction potential during earthquakes", *Soil Dynamics and Earthquake Engineering*, 11th International Conference on Soil Dynamics and Earthquake Engineering (ICSDEE): Part II, Volume 26, Issues 2–4, February–April 2006, Pages 115–130.

International Code Council. *2018 International Building Code*. Falls Church, Va. :International Code Council, 2018.

Ishihara, K., and Yoshimine, M., 1992. *Evaluation of settlements in sand deposits following liquefaction during earthquakes*. Soils and Foundations, JSSMFE, Vol. 32, No. 1, March, pp. 173-188.

King County, 2016, *Surface Water Design Manual,* King County Department of Natural Resources and Parks.

Minard James., 1983, *Geologic Map of the Kirkland Quadrangle,* Washington Department of Natural Resources Division of Geology and Earth Resources, Geologic MapMF-1543, scale 1: 24,000.

Seed, H.B. and Idriss, I.M., 1971, Simplified Procedure for Evaluating Soil Liquefaction Potential. *Journal of Soil Mechanics Foundation Division*, ASCE, Vol. 97, No. SM9, pp. 1249-1273.

Tokimatsu, K. and Seed, H.B., 1987. *Evaluation of Settlement in Sands Due to Earthquake Shaking*. ASCE Journal of Geotechnical Engineering, Vol. 113, No. 8, August 1987.

U.S. Geological Survey, 2019, Unified Hazard Tool, accessed January 15, 2019, from USGS web site, https://earthquake.usgs.gov/hazards/interactive/

WSDOE, 2019, *Stormwater Management Manual for Western Washington*, 19-10-021, Washington State Department of Ecology.

WSDOT, 2019, *Geotechnical Design Manual*, M 46-03.11.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

WSDOT, 2018, *Standard Specifications for Road, Bridge, and Municipal Construction*, M 41-10, Washington State Department of Transportation.

WSDOT, Memo to Designers, 2018, *AASHTO Guide Specifications for LRFD Seismic Bridge Design Amendments*.

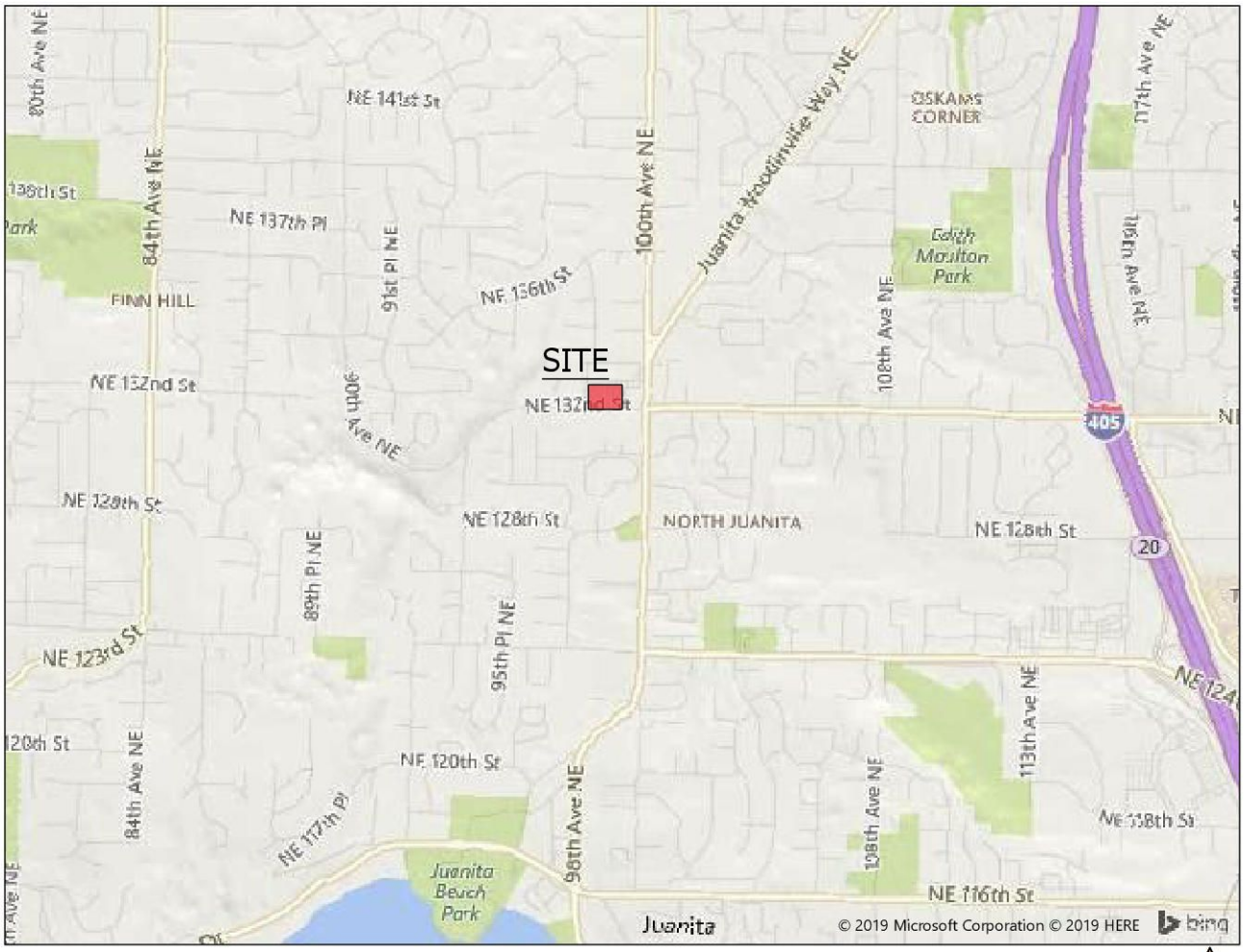
Youd, T.L., et al., 2001, *Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils*, Journal of Geotechnical and Geoenvironmental Engineering, Geo-Institute of the American Society of Civil Engineers (ASCE), Vol. 127, No. 10, October, 2001.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

SITE MAP

0 200' 400' 600' 800'

SCALE: 1" = 400'



VICINITY MAP

0 1000' 2000' 3000' 4000'

SCALE: 1" = 2000'

HWA GEOSCIENCES INC.

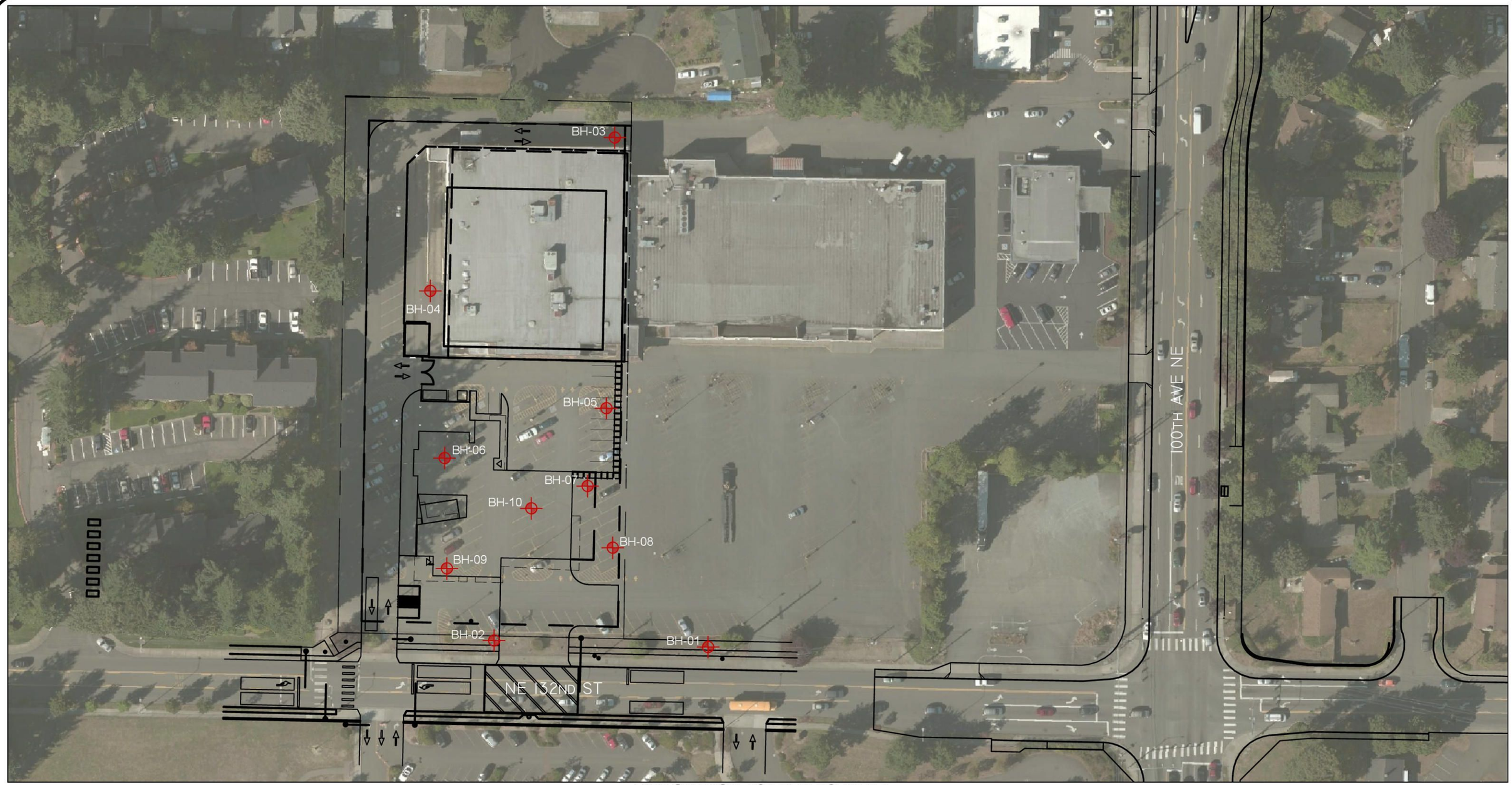
VICINITY MAP

FIRE STATION #24 REPLACEMENT
9820 NE 132nd STREET
KIRKLAND, WASHINGTON

CHECK BY / DRAWN BY	SS / BH BFM
DATE:	05.14.2019
FIGURE #	1
PROJECT #	2018-057-21

S:\2018 PROJECTS\2018-057-21 FIRE STATION 24\CAD\2018-057-21 FIRE STATION #24.DWG <Fig 1> Plotted: 8/29/2019 4:35 PM

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



FIRE STATION #24 REPLACEMENT
Scale: 1" = 150'-0"

EXPLORATION LEGEND

BH-# BOREHOLE DESIGNATION AND APPROXIMATE LOCATION

N

0 75 150 225 300
SCALE: 1" = 150'

BASE MAP PROVIDED BY: BING AND SURVEYOR

S:\2018 PROJECTS\2018-057-21 FIRE STATION 24\CAD\2018-057-21 FIRE STATION #24.DWG <Fig 2> Plotted: 9/23/2019 11:35 AM

HWA GEOSCIENCES INC.

FIRE STATION #24 REPLACEMENT
9820 NE 132nd STREET
KIRKLAND, WASHINGTON

SITE &
EXPLORATION PLAN

DRAWN BY BFM
CHECK BY SS / BH
DATE 09.18.2019

FIGURE NO. 2
PROJECT NO. 2018-057-21

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX A

FIELD EXPLORATIONS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density(%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

USCS SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP DESCRIPTIONS	
Coarse Grained Soils	Gravel and Gravelly Soils	Clean Gravel (little or no fines)	GW	Well-graded GRAVEL
			GP	Poorly-graded GRAVEL
	More than 50% of Coarse Fraction Retained on No. 4 Sieve	Gravel with Fines (appreciable amount of fines)	GM	Silty GRAVEL
			GC	Clayey GRAVEL
More than 50% Retained on No. 200 Sieve Size	Sand and Sandy Soils	Clean Sand (little or no fines)	SW	Well-graded SAND
			SP	Poorly-graded SAND
	50% or More of Coarse Fraction Passing No. 4 Sieve	Sand with Fines (appreciable amount of fines)	SM	Silty SAND
			SC	Clayey SAND
Fine Grained Soils	Silt and Clay	Liquid Limit Less than 50%	ML	SILT
			CL	Lean CLAY
			OL	Organic SILT/Organic CLAY
50% or More Passing No. 200 Sieve Size	Silt and Clay	Liquid Limit 50% or More	MH	Elastic SILT
			CH	Fat CLAY
			OH	Organic SILT/Organic CLAY
Highly Organic Soils			PT	PEAT

TEST SYMBOLS

%F	Percent Fines	
AL	Atterberg Limits:	PL = Plastic Limit LL = Liquid Limit
CBR	California Bearing Ratio	
CN	Consolidation	
DD	Dry Density (pcf)	
DS	Direct Shear	
GS	Grain Size Distribution	
K	Permeability	
MD	Moisture/Density Relationship (Proctor)	
MR	Resilient Modulus	
PID	Photoionization Device Reading	
PP	Pocket Penetrometer	Approx. Compressive Strength (tsf)
SG	Specific Gravity	
TC	Triaxial Compression	
TV	Torvane	Approx. Shear Strength (tsf)
UC	Unconfined Compression	

SAMPLE TYPE SYMBOLS

- 2.0" OD Split Spoon (SPT) (140 lb. hammer with 30 in. drop)
- Shelby Tube
- 3-1/4" OD Split Spoon with Brass Rings
- Small Bag Sample
- Large Bag (Bulk) Sample
- Core Run
- Non-standard Penetration Test (3.0" OD split spoon)

GROUNDWATER SYMBOLS

- Groundwater Level (measured at time of drilling)
- Groundwater Level (measured in well or open hole after water level stabilized)

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

COMPONENT PROPORTIONS

PROPORTION RANGE	DESCRIPTIVE TERMS
< 5%	Clean
5 - 12%	Slightly (Clayey, Silty, Sandy)
12 - 30%	Clayey, Silty, Sandy, Gravelly
30 - 50%	Very (Clayey, Silty, Sandy, Gravelly)
Components are arranged in order of increasing quantities.	

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation. Soil descriptions are presented in the following general order:

Density/consistency, color, modifier (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and angularity of constituents, additional comments. (GEOLOGIC INTERPRETATION)

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
MOIST	Damp but no visible water.
WET	Visible free water, usually soil is below water table.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

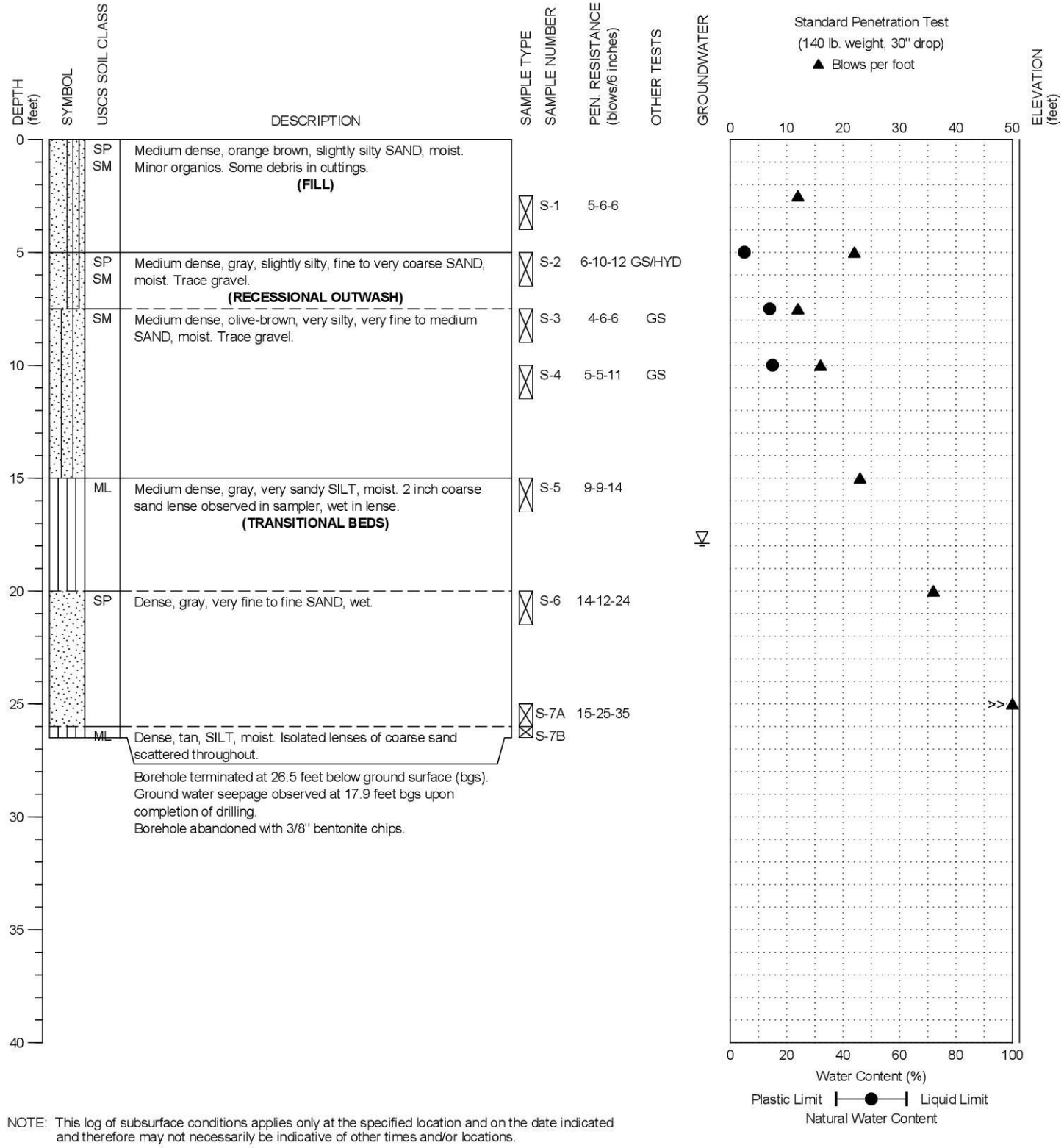
LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 2018-057-21 FIGURE: A-1

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Geologic Drill, Inc.
DRILLING METHOD: Bobcat Mounted Track Rig
SAMPLING METHOD: SPT with Rope & Cathead
LOCATION: See Figure 2

DATE STARTED: 5/13/2019
DATE COMPLETED: 5/13/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-01

PAGE: 1 of 1

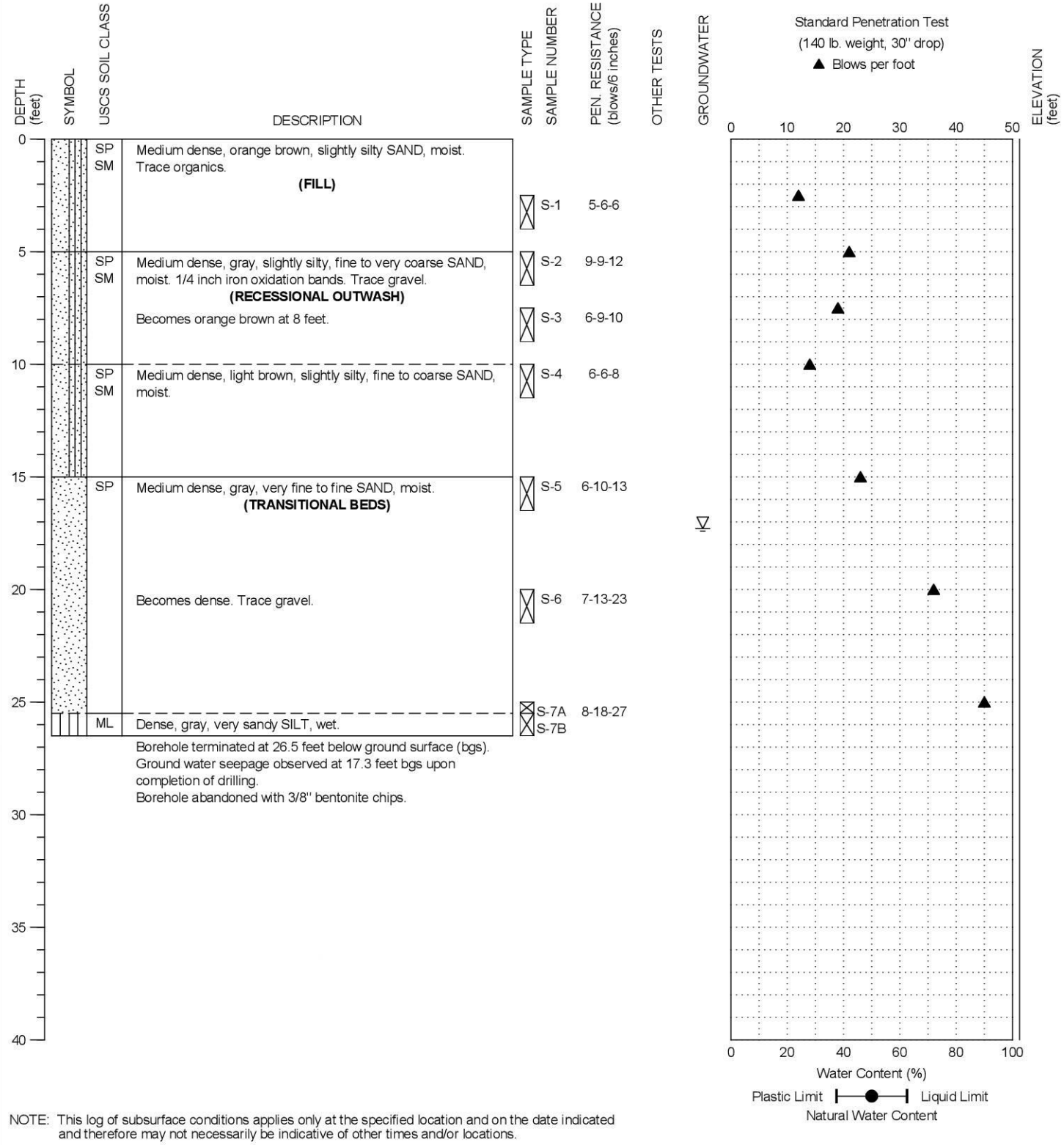
PROJECT NO.: 2018-057-21 FIGURE: A-2

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Geologic Drill, Inc.
DRILLING METHOD: Bobcat Mounted Track Rig
SAMPLING METHOD: SPT with Rope & Cathead
LOCATION: See Figure 2

DATE STARTED: 5/13/2019
DATE COMPLETED: 5/13/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-02

PAGE: 1 of 1

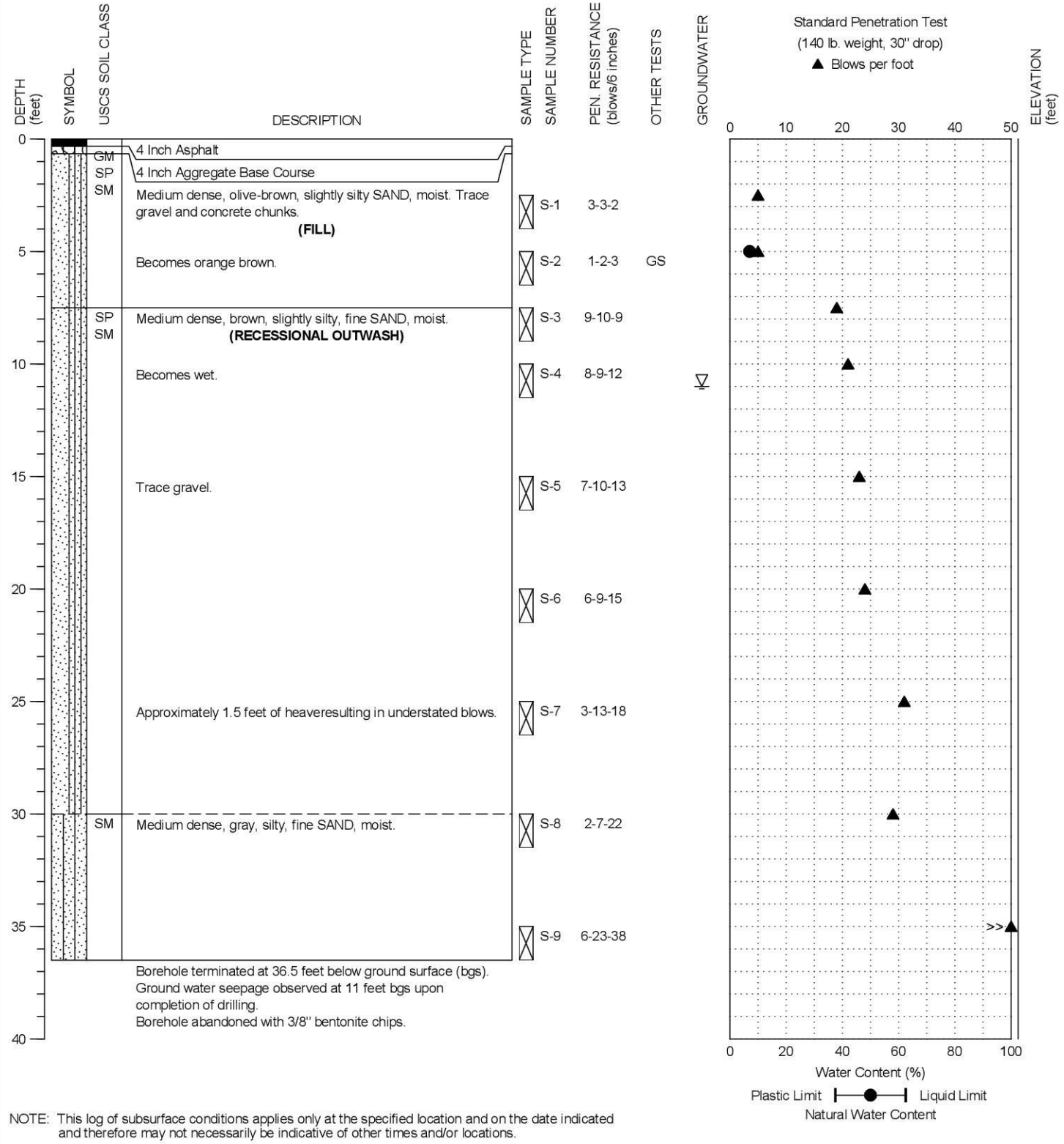
PROJECT NO.: 2018-057-21 FIGURE: A-3

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/16/2019
DATE COMPLETED: 8/16/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-03

PAGE: 1 of 1

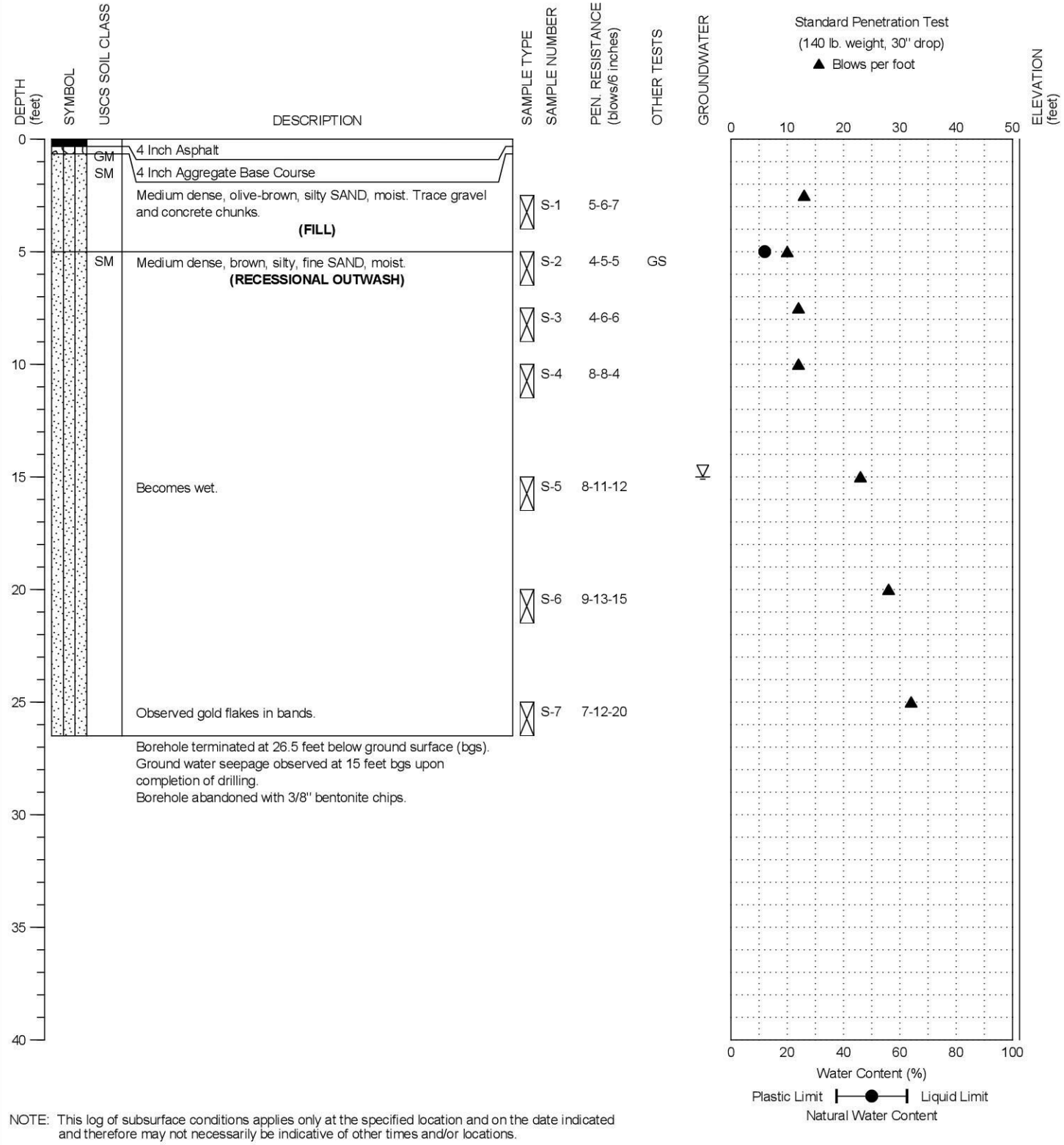
PROJECT NO.: 2018-057-21 FIGURE: A-4

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/16/2019
DATE COMPLETED: 8/16/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-04

PAGE: 1 of 1

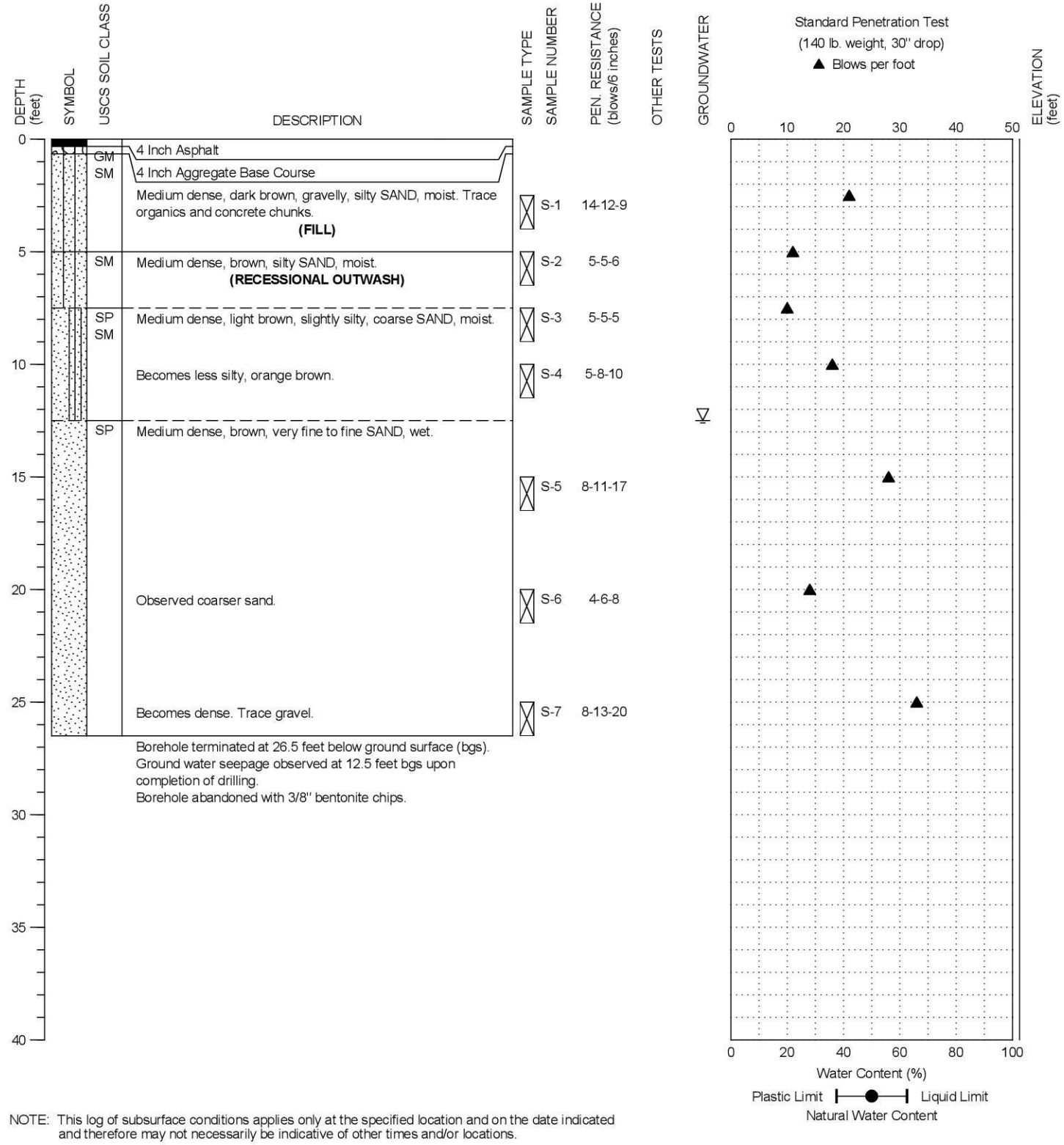
PROJECT NO.: 2018-057-21 FIGURE: A-5

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/14/2019
DATE COMPLETED: 8/14/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-05

PAGE: 1 of 1

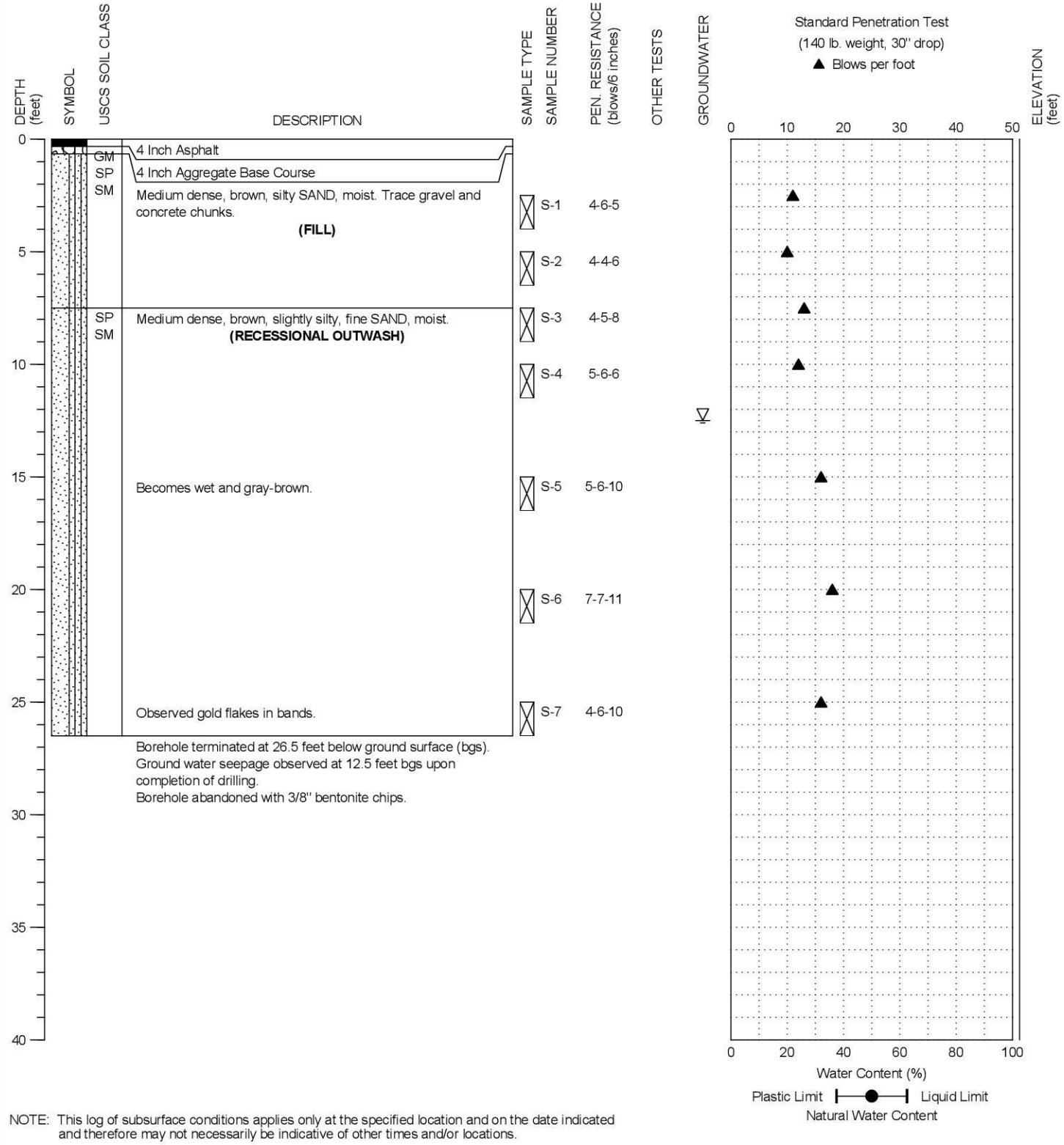
PROJECT NO.: 2018-057-21 FIGURE: A-6

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/14/2019
DATE COMPLETED: 8/14/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-06

PAGE: 1 of 1

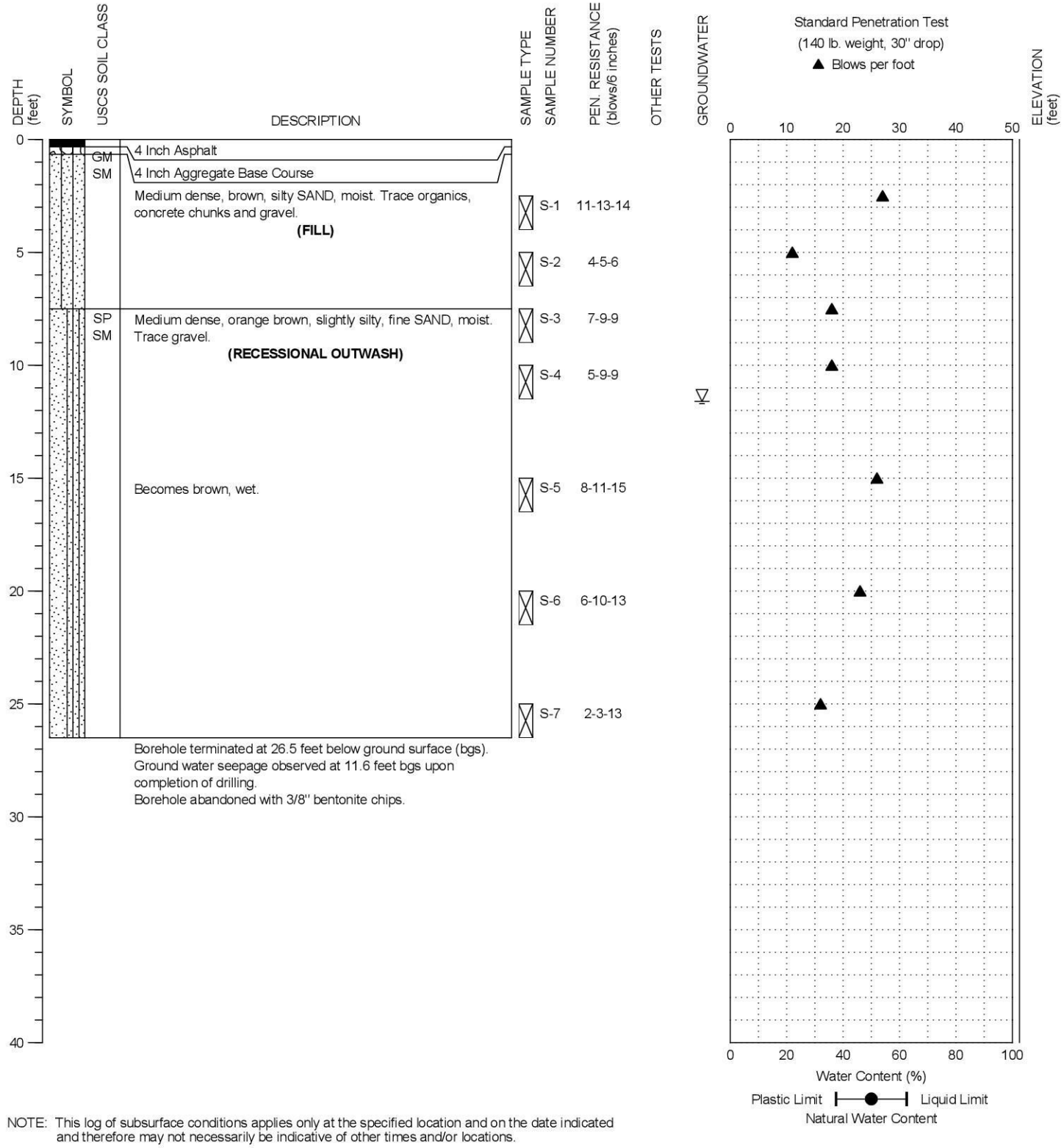
PROJECT NO.: 2018-057-21 FIGURE: A-7

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/14/2019
DATE COMPLETED: 8/14/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-07

PAGE: 1 of 1

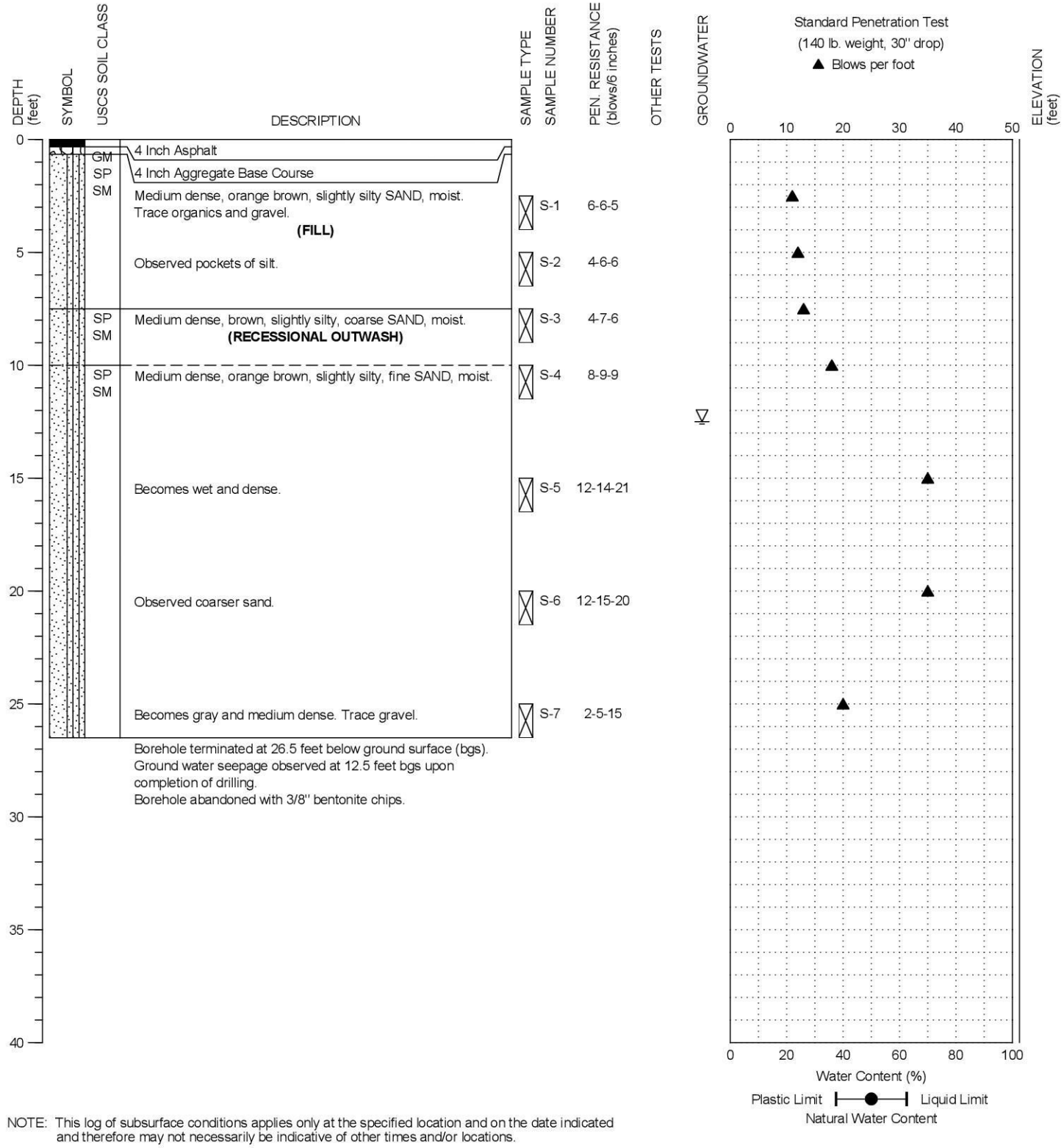
PROJECT NO.: 2018-057-21 FIGURE: A-8

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/14/2019
DATE COMPLETED: 8/14/2019
LOGGED BY: S. Schlitt



Borehole terminated at 26.5 feet below ground surface (bgs).
Ground water seepage observed at 12.5 feet bgs upon completion of drilling.
Borehole abandoned with 3/8" bentonite chips.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-08

PAGE: 1 of 1

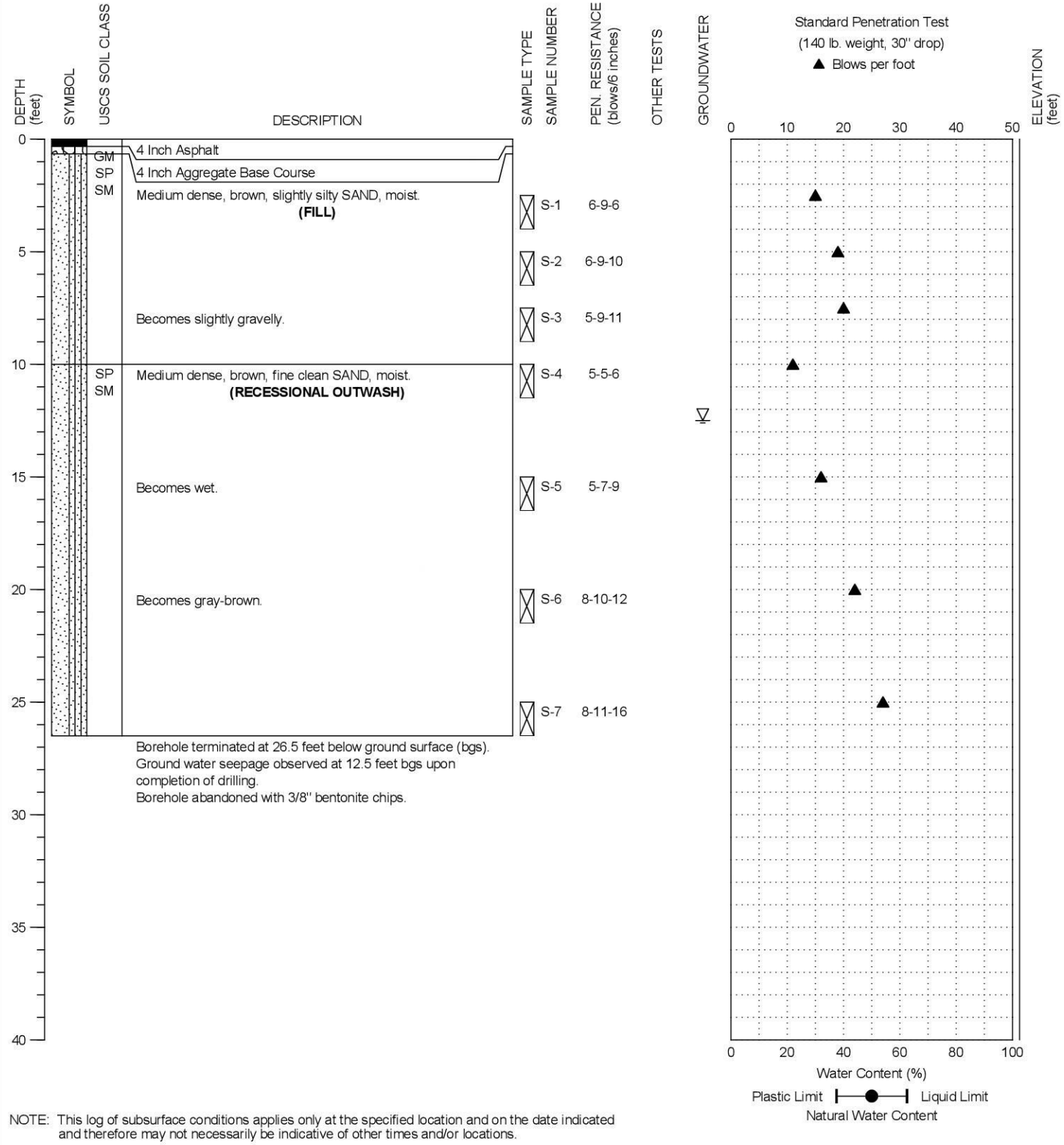
PROJECT NO.: 2018-057-21 FIGURE: A-9

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/14/2019
DATE COMPLETED: 8/14/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-09

PAGE: 1 of 1

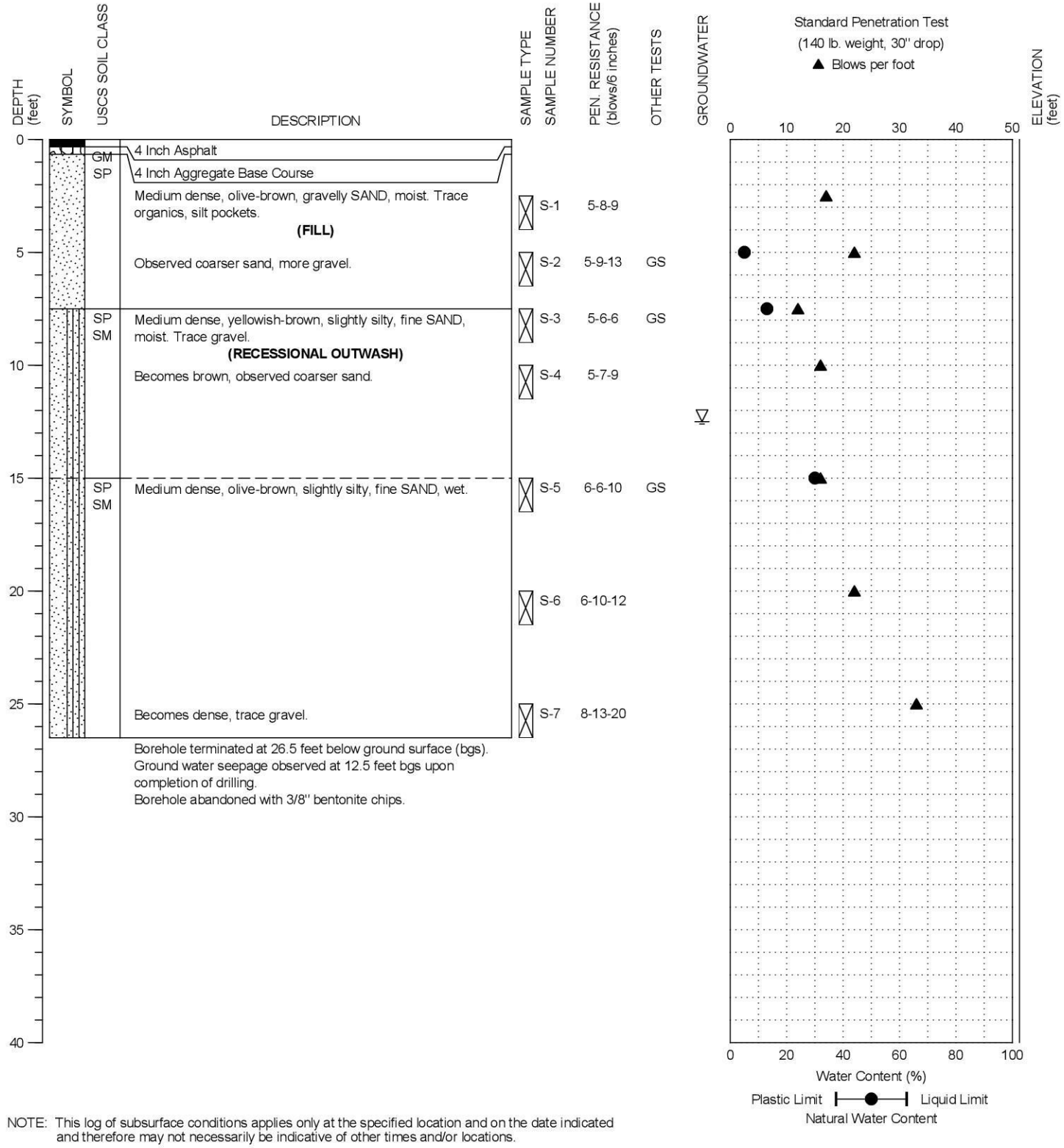
PROJECT NO.: 2018-057-21 FIGURE: A-10

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 8/14/2019
DATE COMPLETED: 8/14/2019
LOGGED BY: S. Schlitt



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

BORING:
BH-10

PAGE: 1 of 1

PROJECT NO.: 2018-057-21 FIGURE: A-11

BORING-DSM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX B

LABORATORY TEST RESULTS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX B

LABORATORY INVESTIGATION

Representative soil samples obtained from our explorations were placed in plastic bags to prevent loss of moisture and transported to our Bothell, Washington, laboratory for further examination and testing. Laboratory tests were conducted on selected soil samples to characterize relevant engineering and index properties of the site soils. Laboratory testing was conducted as described below:

MOISTURE CONTENT OF SOIL: The moisture content of selected soil samples (percent by dry mass) was determined in general accordance with ASTM D 2216. The results are shown at the sampled intervals on the appropriate exploration logs in Appendix A.

PARTICLE SIZE ANALYSIS OF SOILS: Selected samples were tested to determine the particle (grain) size distribution of material in general accordance with ASTM D 422. The results are summarized on the attached Summary of Material Properties report , Figure B-1, and the Particle Size Analysis of Soils reports, Figures B-2 through B-4, which also provide information regarding the classification of the sample, and the moisture content at the time of testing.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%) (440° C)	ORGANIC CONTENT (%) (750° C)	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% SILT	% CLAY	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI						
BH-01	5.0	6.5	4.9						4.4	89.5	5.4	0.7	SP-SM	Gray, poorly graded SAND with silt
BH-01	7.5	9.0	14.1						3.7	60.6			SM	Olive-brown, silty SAND
BH-01	10.0	11.5	14.6						2.8	61.6			SM	Olive-brown, silty SAND
BH-03	5.0	6.5	7.5						0.1	91.3	6.8	1.8	SP-SM	Olive-brown, poorly graded SAND with silt
BH-04	5.0	6.5	12.0						0.1	87.7	9.8	2.4	SM	Olive-brown, silty SAND
BH-10	5.0	6.5	5.3						15.2	80.7			SP	Olive-brown, poorly graded SAND with gravel
BH-10	7.5	9.0	12.6							92.5			SP-SM	Yellowish-brown, poorly graded SAND with silt
BH-10	15.0	16.5	30.2							90.7			SP-SM	Olive-brown, poorly graded SAND with silt

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

2. The classification of soils in this table is based on ASTM D2487 and D2488 as applicable.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

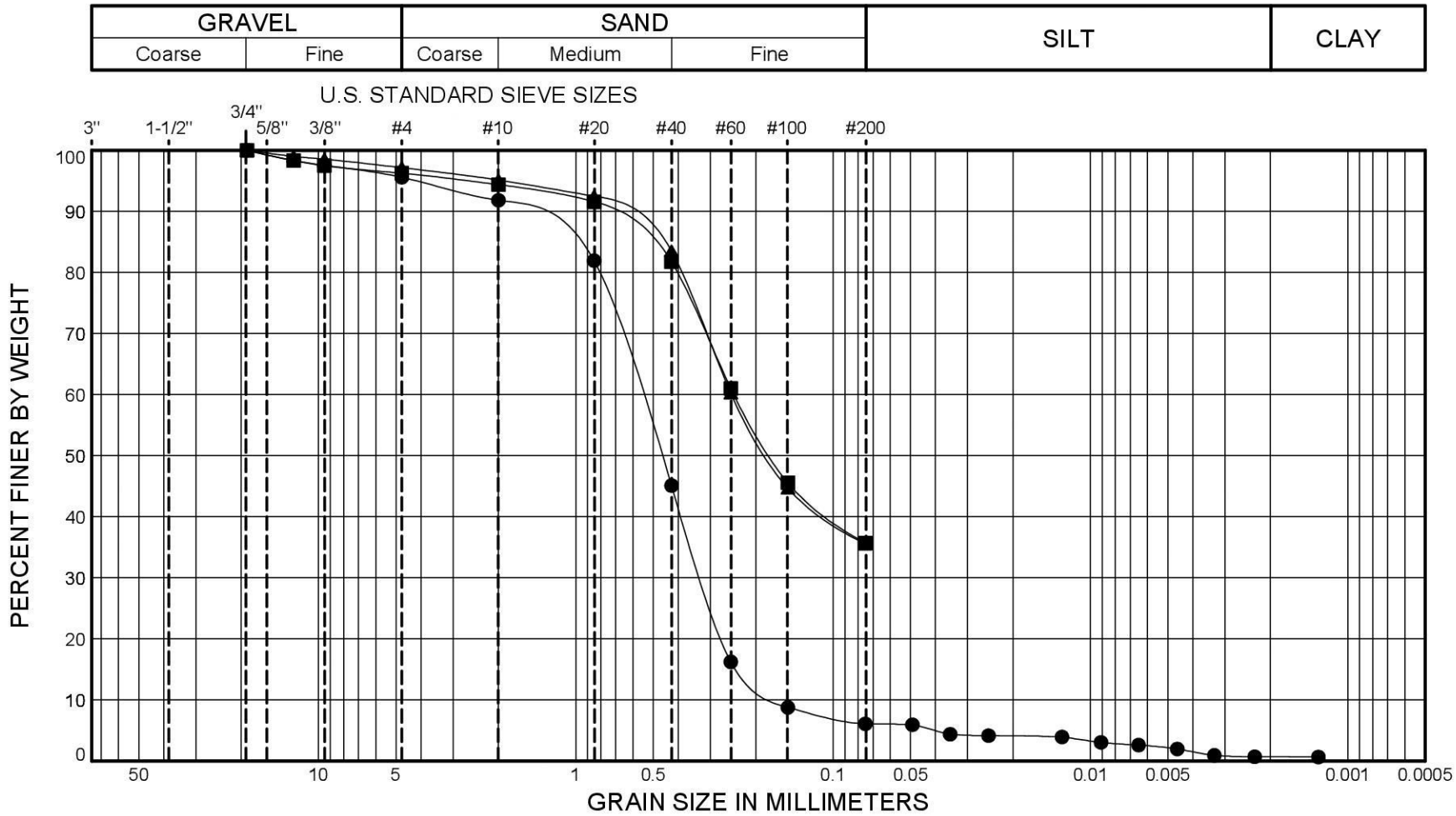
SUMMARY OF
MATERIAL PROPERTIES

PAGE: 1 of 1

PROJECT NO.: 2018-057-21 FIGURE: B-1

INDEX MATSUM 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	D90	D60	D10	Gravel %	Sand %	Silt %	Clay %
●	BH-01	S-2	5.0 - 6.5	(SP-SM) Gray, poorly graded SAND with silt	5	1.71	0.56	0.1632	4.4	89.5	5.4	0.7
■	BH-01	S-3	7.5 - 9.0	(SM) Olive-brown, silty SAND	14	0.76	0.24		3.7	60.6		
▲	BH-01	S-4	10.0 - 11.5	(SM) Olive-brown, silty SAND	15	0.70	0.25		2.8	61.6		

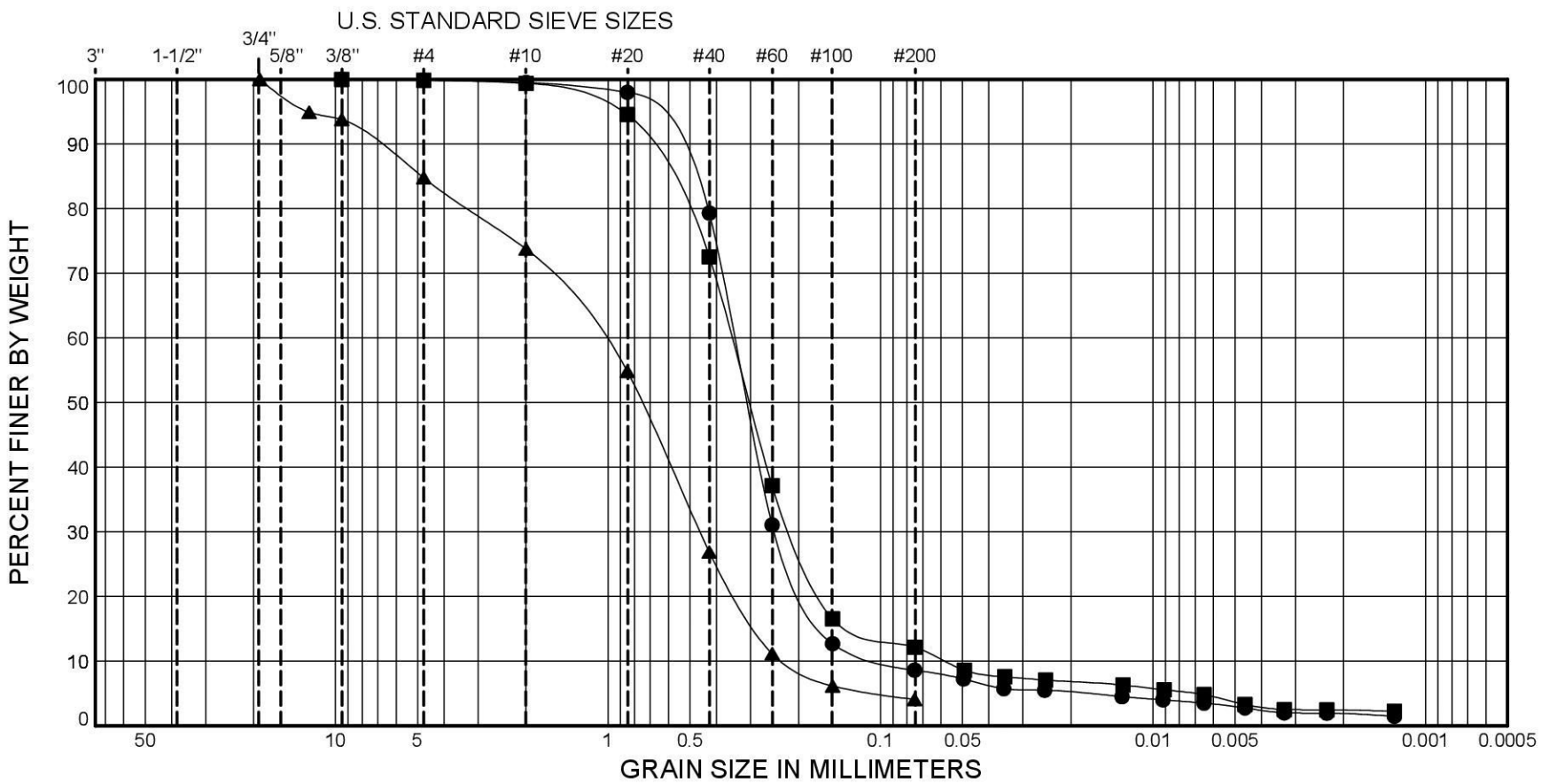
HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2018-057-21 FIGURE: B-2

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	D90	D60	D10	Gravel %	Sand %	Silt %	Clay %
●	BH-03	S-2	5.0 - 6.5	(SP-SM) Olive-brown, poorly graded SAND with silt	7	0.63	0.34	0.0951	0.1	91.3	6.8	1.8
■	BH-04	S-2	5.0 - 6.5	(SM) Olive-brown, silty SAND	12	0.74	0.35	0.0582	0.1	87.7	9.8	2.4
▲	BH-10	S-2	5.0 - 6.5	(SP) Olive-brown, poorly graded SAND with gravel	5	7.10	1.07	0.2225	15.2	80.7		

HWA GeoSciences Inc.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

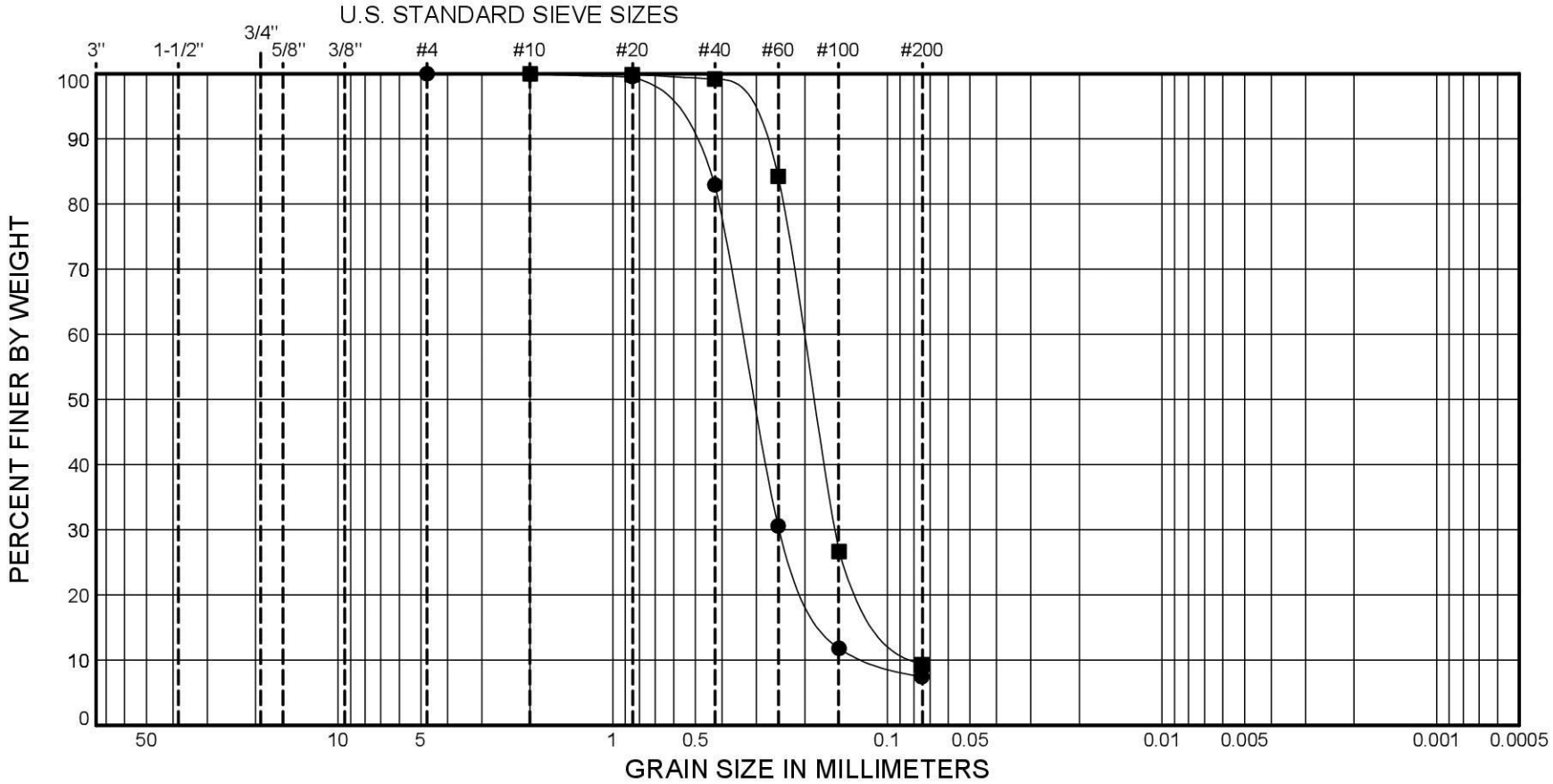
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2018-057-21 FIGURE: B-3

HWA GRSZ D90-D60-D10 2018-057.GPJ 9/18/19

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	D90	D60	D10	Gravel %	Sand %	Silt %	Clay %
●	BH-10	S-3	7.5 - 9.0	(SP-SM) Yellowish-brown, poorly graded SAND with silt	13	0.57	0.34	0.1126		92.5		
■	BH-10	S-5	15.0 - 16.5	(SP-SM) Olive-brown, poorly graded SAND with silt	30	0.31	0.20	0.0772		90.7		

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
KIRKLAND, WASHINGTON

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2018-057-21 FIGURE: B-4

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX C

PHOTOS FOR ASSESSMENT OF ROCKERY CONDITIONS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 1: Rockery Wall constructed above concrete retaining wall

Plate 2: Tree growth within rockery wall

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 3: Tree stump observed at toe of rockery

Plate 4: Tree growth at rock of rockery wall, displaced rockery wall due to root growth and a continuous joint plane observed

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 5: Overgrowth of shrubbery on wall face

Plate 6: Near vertical wall face

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

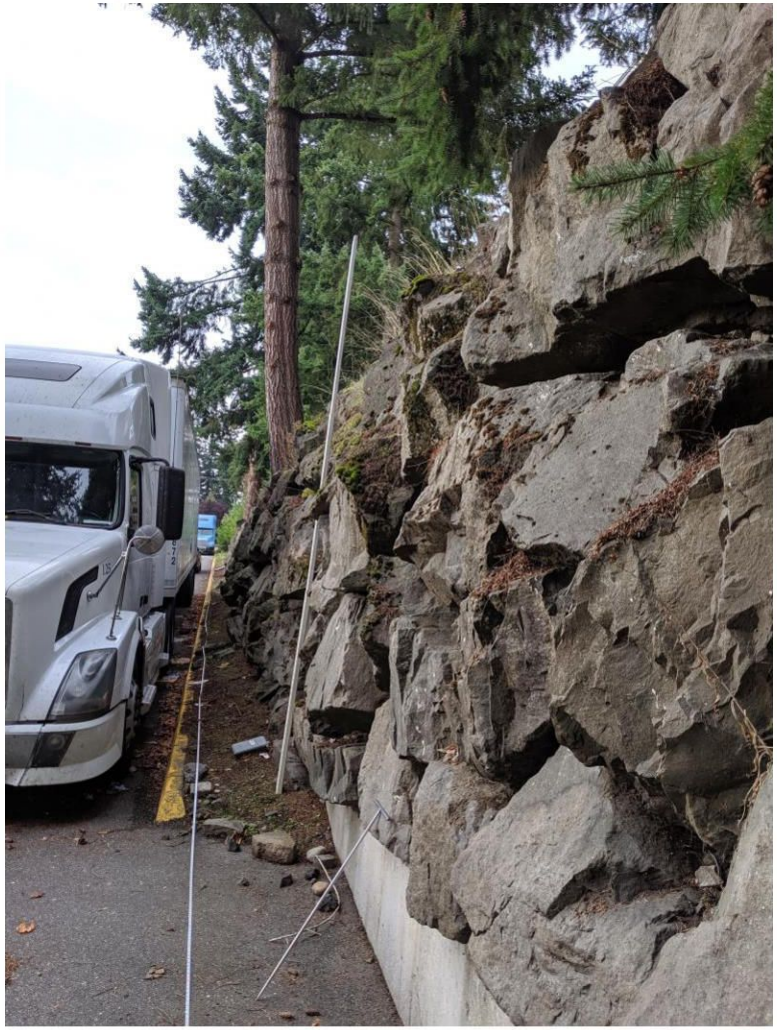


Plate 7: Near vertical wall face likely due to bulge

Plate 8: Rocks oriented with long axis parallel to wall face

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 9: Insufficiently sized rock placed at base of wall

Plate 10: Stacked rock placed directly on top of another rock leading to failure

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 11: Root growth in voids where quarry spalls should be observed

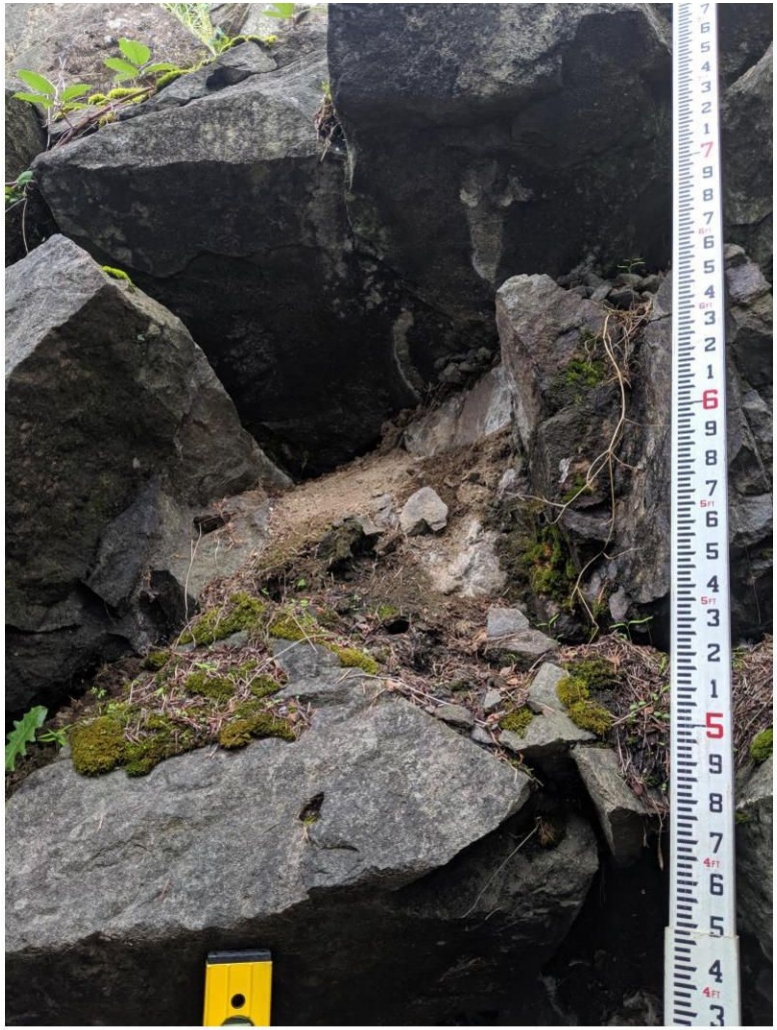


Plate 12: Signs of rockfall in void where a chinked rock should have been placed

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 13: Fallen rocks placed to the side of the existing property

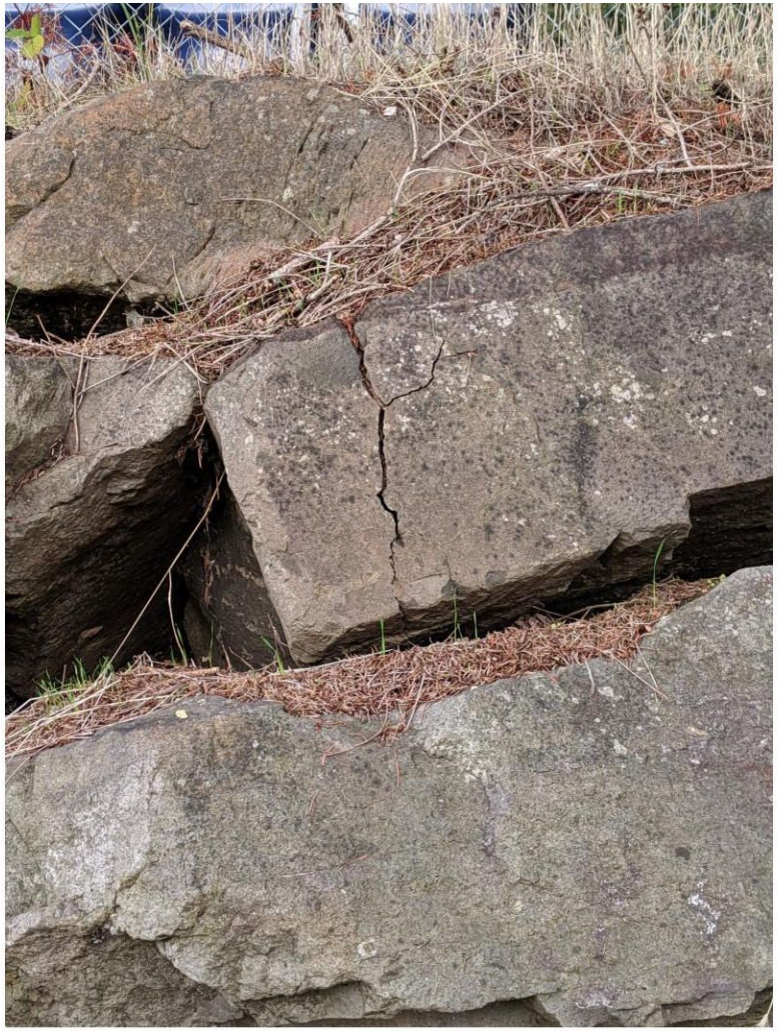


Plate 14: Cracking rocks due to insufficient rock strength

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 15: Cracking rocks and highly weathered rocks prone to failure

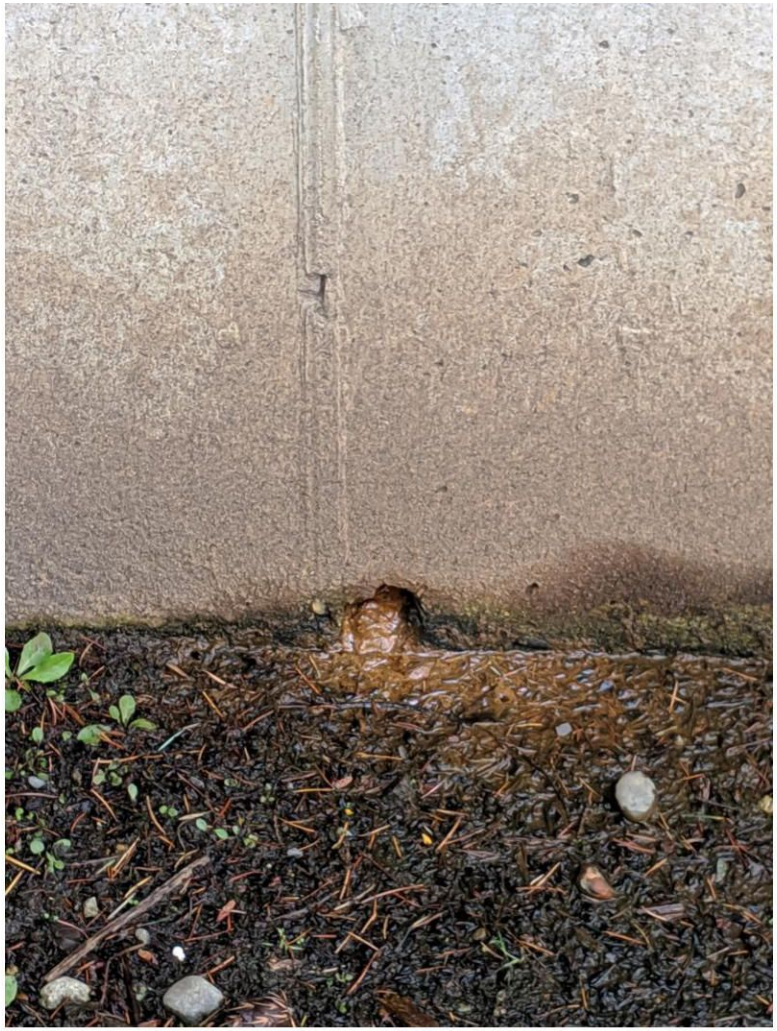


Plate 16: Weep hole at the base of the concrete retaining wall

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 17: Second weep hole at the base of the retaining wall

Plate 18: Crack in concrete retaining wall allowing seepage through wall

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Plate 19: Seepage observed beneath the base of the wall where no weep hole has been drilled

Plate 20: Overhanging rockery wall above concrete retaining wall

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX D

ENVIRONMENTAL LABORATORY TESTING RESULTS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 26, 2019

Bryan Hawkins
HWA GeoSciences, Inc.
21312 30th Drive SE, Suite 110
Bothell, WA 98021

Re: Analytical Data for Project 2018-057
Laboratory Reference No. 1908-186

Dear Bryan:

Enclosed are the analytical results and associated quality control data for samples submitted on August 14, 2019.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

Case Narrative

Samples were collected on August 14, 2019 and received by the laboratory on August 14, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Organophosphorus Pesticides EPA 8270D/SIM Analysis

Samples BH-6 0'-10' Grab, BH-8 0'-10' Grab, BH-5 0'-10' Grab, BH-7 0'-10' Grab, BH-4 0'-10' Grab and the method blank each had one surrogate recovery above control limits. The spike blank and spike blank duplicate had three compounds with recoveries above the control limits. Because these results showed high bias and the samples were all non-detect, no further action was taken.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-3 0'-10'Grab**					
Laboratory ID:	08-186-01					
alpha-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
gamma-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
beta-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
delta-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Heptachlor	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Aldrin	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Heptachlor Epoxide	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan I	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Dieldrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan II	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Methoxychlor	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Toxaphene	**ND**	56	EPA 8081B	8-16-19	8-16-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*68*	*31-97*				
DCB	*91*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-6 0'-10'Grab**					
Laboratory ID:	08-186-02					
alpha-BHC	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
gamma-BHC	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
beta-BHC	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
delta-BHC	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
Heptachlor	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
Aldrin	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
Heptachlor Epoxide	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-19-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-19-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endosulfan I	**ND**	5.5	EPA 8081B	8-16-19	8-19-19	
Dieldrin	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endrin	**ND**	11	EPA 8081B	8-16-19	8-19-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endosulfan II	**ND**	11	EPA 8081B	8-16-19	8-19-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Methoxychlor	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Toxaphene	**ND**	55	EPA 8081B	8-16-19	8-19-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*71*	*31-97*				
DCB	*80*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-8 0'-10'Grab**					
Laboratory ID:	08-186-03					
alpha-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
gamma-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
beta-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
delta-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
Heptachlor	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
Aldrin	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
Heptachlor Epoxide	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-19-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-19-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endosulfan I	**ND**	5.3	EPA 8081B	8-16-19	8-19-19	
Dieldrin	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endrin	**ND**	11	EPA 8081B	8-16-19	8-19-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endosulfan II	**ND**	11	EPA 8081B	8-16-19	8-19-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Methoxychlor	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-16-19	8-19-19	
Toxaphene	**ND**	53	EPA 8081B	8-16-19	8-19-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*68*	*31-97*				
DCB	*74*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-5 0'-10'Grab**					
Laboratory ID:	08-186-04					
alpha-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
gamma-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
beta-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
delta-BHC	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Heptachlor	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Aldrin	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Heptachlor Epoxide	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan I	**ND**	5.6	EPA 8081B	8-16-19	8-16-19	
Dieldrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan II	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Methoxychlor	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Toxaphene	**ND**	56	EPA 8081B	8-16-19	8-16-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*73*	*31-97*				
DCB	*89*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-7 0'-10'Grab**					
Laboratory ID:	08-186-05					
alpha-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
gamma-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
beta-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
delta-BHC	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
Heptachlor	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
Aldrin	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
Heptachlor Epoxide	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan I	**ND**	5.3	EPA 8081B	8-16-19	8-16-19	
Dieldrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan II	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Methoxychlor	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Toxaphene	**ND**	53	EPA 8081B	8-16-19	8-16-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*71*	*31-97*				
DCB	*84*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-4 0'-10'Grab**					
Laboratory ID:	08-186-06					
alpha-BHC	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
gamma-BHC	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
beta-BHC	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
delta-BHC	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
Heptachlor	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
Aldrin	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
Heptachlor Epoxide	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan I	**ND**	5.7	EPA 8081B	8-16-19	8-16-19	
Dieldrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan II	**ND**	11	EPA 8081B	8-16-19	8-16-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Methoxychlor	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-16-19	8-16-19	
Toxaphene	**ND**	57	EPA 8081B	8-16-19	8-16-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*75*	*31-97*				
DCB	*88*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0816S1					
alpha-BHC	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
gamma-BHC	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
beta-BHC	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
delta-BHC	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
Heptachlor	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
Aldrin	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
Heptachlor Epoxide	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
gamma-Chlordane	**ND**	10	EPA 8081B	8-16-19	8-16-19	
alpha-Chlordane	**ND**	10	EPA 8081B	8-16-19	8-16-19	
4,4'-DDE	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Endosulfan I	**ND**	5.0	EPA 8081B	8-16-19	8-16-19	
Dieldrin	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Endrin	**ND**	10	EPA 8081B	8-16-19	8-16-19	
4,4'-DDD	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Endosulfan II	**ND**	10	EPA 8081B	8-16-19	8-16-19	
4,4'-DDT	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Endrin Aldehyde	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Methoxychlor	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Endosulfan Sulfate	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Endrin Ketone	**ND**	10	EPA 8081B	8-16-19	8-16-19	
Toxaphene	**ND**	50	EPA 8081B	8-16-19	8-16-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*79*	*31-97*				
DCB	*101*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B SB/SBD QUALITY CONTROL

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0816S1										
	SB	SBD	SB	SBD		SB	SBD				
alpha-BHC	**88.4**	**89.5**	100	100	N/A	**88**	**90**	55-110	1	15	
gamma-BHC	**83.7**	**84.7**	100	100	N/A	**84**	**85**	55-110	1	15	
beta-BHC	**87.7**	**89.1**	100	100	N/A	**88**	**89**	50-110	2	15	
delta-BHC	**81.0**	**82.1**	100	100	N/A	**81**	**82**	50-110	1	16	
Heptachlor	**76.2**	**77.7**	100	100	N/A	**76**	**78**	54-111	2	15	
Aldrin	**84.8**	**85.7**	100	100	N/A	**85**	**86**	51-110	1	15	
Heptachlor Epoxide	**80.9**	**82.3**	100	100	N/A	**81**	**82**	49-114	2	15	
gamma-Chlordane	**83.1**	**84.2**	100	100	N/A	**83**	**84**	51-110	1	15	
alpha-Chlordane	**81.6**	**82.8**	100	100	N/A	**82**	**83**	47-114	1	15	
4,4'-DDE	**92.9**	**95.5**	100	100	N/A	**93**	**95**	58-110	3	15	
Endosulfan I	**87.0**	**88.5**	100	100	N/A	**87**	**88**	56-110	2	15	
Dieldrin	**86.2**	**87.7**	100	100	N/A	**86**	**88**	51-112	2	15	
Endrin	**85.5**	**87.2**	100	100	N/A	**86**	**87**	49-117	2	15	
4,4'-DDD	**85.5**	**88.3**	100	100	N/A	**85**	**88**	56-110	3	15	
Endosulfan II	**80.3**	**82.0**	100	100	N/A	**80**	**82**	51-116	2	15	
4,4'-DDT	**82.5**	**86.9**	100	100	N/A	**83**	**87**	51-110	5	15	
Endrin Aldehyde	**74.4**	**74.9**	100	100	N/A	**74**	**75**	54-115	1	15	
Methoxychlor	**83.3**	**87.2**	100	100	N/A	**83**	**87**	53-115	5	15	
Endosulfan Sulfate	**76.5**	**78.3**	100	100	N/A	**76**	**78**	52-110	2	15	
Endrin Ketone	**78.4**	**81.2**	100	100	N/A	**78**	**81**	51-112	4	15	
Surrogate:											
TCMX						*67*	*69*	*31-97*			
DCB						*86*	*90*	*26-105*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-3 0'-10'Grab**					
Laboratory ID:	08-186-01					
Dichlorvos(DDVP)	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.033	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*111*	*26 - 123*				
Triphenyl phosphate	*82*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-6 0'-10'Grab**					
Laboratory ID:	08-186-02					
Dichlorvos(DDVP)	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.055	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.033	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.055	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.055	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.055	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.029	EPA 8270D/SIM	8-22-19	8-23-19	U1
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*147*	*26 - 123*				Q
Triphenyl phosphate	*65*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-8 0'-10'Grab**					
Laboratory ID:	08-186-03					
Dichlorvos(DDVP)	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.032	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*157*	*26 - 123*				Q
Triphenyl phosphate	*66*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-5 0'-10'Grab**					
Laboratory ID:	08-186-04					
Dichlorvos(DDVP)	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.033	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	U1
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*151*	*26 - 123*				Q
Triphenyl phosphate	*74*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-7 0'-10'Grab**					
Laboratory ID:	08-186-05					
Dichlorvos(DDVP)	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.032	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.053	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.021	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*149*	*26 - 123*				Q
Triphenyl phosphate	*73*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-4 0'-10'Grab**					
Laboratory ID:	08-186-06					
Dichlorvos(DDVP)	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.057	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.034	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.057	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.057	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.023	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.057	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.039	EPA 8270D/SIM	8-22-19	8-23-19	U1
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*255*	*26 - 123*				Q
Triphenyl phosphate	*70*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0822S1					
Dichlorvos(DDVP)	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.030	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*145*	*26 - 123*				Q
Triphenyl phosphate	*89*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM MS/MSD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-186-01										
	MS	MSD	MS	MSD		MS	MSD				
Dichlorvos(DDVP)	**0.0731**	**0.0793**	0.100	0.100	ND	73	79	40 - 125	8	23	
Mevinphos/Phosdrin	**0.0797**	**0.0847**	0.100	0.100	ND	80	85	43 - 102	6	25	
Ethoprophos	**0.0564**	**0.0516**	0.100	0.100	ND	56	52	53 - 106	9	24	I
Sulfotepp	**0.0902**	**0.0760**	0.100	0.100	ND	90	76	60 - 107	17	22	
Phorate	**0.0781**	**0.0881**	0.100	0.100	ND	78	88	51 - 106	12	26	
Dimethoate	**0.0820**	**0.0723**	0.100	0.100	ND	82	72	56 - 107	13	21	
Demeton-S	**0.0685**	**0.0726**	0.100	0.100	ND	69	73	40 - 110	6	26	
Diazinon	**0.0801**	**0.0922**	0.100	0.100	ND	80	92	54 - 105	14	21	
Disulfoton	**0.0804**	**0.0816**	0.100	0.100	ND	80	82	42 - 110	1	22	
Parathion-methyl	**0.0929**	**0.111**	0.100	0.100	ND	93	111	53 - 105	18	24	I
Fenchlorphos/Ronnel	**0.0731**	**0.0795**	0.100	0.100	ND	73	80	53 - 106	8	21	
Malathion	**0.0980**	**0.0859**	0.100	0.100	ND	98	86	58 - 109	13	21	
Fenthion	**0.0675**	**0.0730**	0.100	0.100	ND	68	73	54 - 107	8	22	
Parathion-ethyl	**0.148**	**0.149**	0.100	0.100	ND	148	149	56 - 107	1	23	II
Chlorpyrifos/Dursban	**0.0658**	**0.0714**	0.100	0.100	ND	66	71	53 - 108	8	21	
Trichloronate	**0.0648**	**0.0738**	0.100	0.100	ND	65	74	55 - 106	13	20	
Stirofos/Tetrachlorvinphos	**0.0847**	**0.0890**	0.100	0.100	ND	85	89	41 - 121	5	22	
Tokuthion/Prothiofos	**0.0673**	**0.0688**	0.100	0.100	ND	67	69	53 - 108	2	21	
Fensulfothion	**0.0830**	**0.0892**	0.100	0.100	ND	83	89	39 - 116	7	26	
Bolstar/Sulprofos	**0.0701**	**0.0755**	0.100	0.100	ND	70	76	54 - 108	7	21	
EPN	**0.137**	**0.138**	0.100	0.100	ND	137	138	47 - 115	1	23	II
Azinphos-methyl/Guthion	**0.0839**	**0.0855**	0.100	0.100	ND	84	86	20 - 134	2	24	
Coumaphos	**0.0789**	**0.0815**	0.100	0.100	ND	79	82	42 - 132	3	25	
Surrogate:											
Tributyl phosphate						*153*	*146*	*26 - 123*			Q,Q
Triphenyl phosphate						*73*	*68*	*47 - 123*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

CHLORINATED ACID HERBICIDES EPA 8151A

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-3 0'-10'Grab**					
Laboratory ID:	08-186-01					
Dalapon	**ND**	51	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	10	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	1000	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2600	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	79	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.3	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*68*	*10-114*				
Client ID:	**BH-6 0'-10'Grab**					
Laboratory ID:	08-186-02					
Dalapon	**ND**	50	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	10	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	1000	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2600	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	77	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.2	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*60*	*10-114*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

CHLORINATED ACID HERBICIDES EPA 8151A

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-8 0'-10'Grab**					
Laboratory ID:	08-186-03					
Dalapon	**ND**	48	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	9.9	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	980	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2500	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	74	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	9.9	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.0	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	9.9	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*67*	*10-114*				
Client ID:	**BH-5 0'-10'Grab**					
Laboratory ID:	08-186-04					
Dalapon	**ND**	51	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	10	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	1000	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2600	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	79	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.3	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*73*	*10-114*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

CHLORINATED ACID HERBICIDES EPA 8151A

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-7 0'-10'Grab**					
Laboratory ID:	08-186-05					
Dalapon	**ND**	49	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	10	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	990	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2500	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	75	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.0	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*66*	*10-114*				
Client ID:	**BH-4 0'-10'Grab**					
Laboratory ID:	08-186-06					
Dalapon	**ND**	52	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	11	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	1100	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2600	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	80	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.4	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*53*	*10-114*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

CHLORINATED ACID HERBICIDES EPA 8151A QUALITY CONTROL

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0819S1					
Dalapon	**ND**	46	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	9.4	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	940	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2300	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	71	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	9.4	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	4.8	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*71*	*10-114*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-186-01										
	MS	MSD	MS	MSD		MS	MSD				
Dalapon	**94.6**	**85.2**	350	350	ND	**27**	**24**	10-140	10	35	
Dicamba	**164**	**139**	250	250	ND	**65**	**56**	10-136	17	33	
MCPP	**25500**	**22400**	25000	25000	ND	**102**	**90**	40-140	13	35	
MCPA	**22400**	**19100**	25000	25000	ND	**90**	**77**	40-140	16	35	
Dichlorprop	**203**	**177**	250	250	ND	**81**	**71**	40-140	14	35	
2,4-D	**173**	**163**	250	250	ND	**69**	**65**	10-103	6	31	
Pentachlorophenol	**22.8**	**18.6**	25.0	25.0	ND	**91**	**74**	10-124	20	29	
2,4,5-TP (Silvex)	**224**	**200**	250	250	ND	**89**	**80**	40-140	11	35	
2,4,5-T	**200**	**186**	250	250	ND	**80**	**74**	10-118	7	29	
2,4-DB	**248**	**220**	250	250	ND	**99**	**88**	10-143	12	28	
Dinoseb	**213**	**160**	250	250	ND	**85**	**64**	40-140	28	35	
Surrogate:											
DCAA						*83*	*75*	*10-114*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

TOTAL METALS
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-3 0'-10'Grab**					
Laboratory ID:	08-186-01					
Arsenic	**ND**	11	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.6	EPA 6010D	8-16-19	8-16-19	
Client ID:	**BH-6 0'-10'Grab**					
Laboratory ID:	08-186-02					
Arsenic	**ND**	11	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.5	EPA 6010D	8-16-19	8-16-19	
Client ID:	**BH-8 0'-10'Grab**					
Laboratory ID:	08-186-03					
Arsenic	**ND**	11	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.3	EPA 6010D	8-16-19	8-16-19	
Client ID:	**BH-5 0'-10'Grab**					
Laboratory ID:	08-186-04					
Arsenic	**ND**	11	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.6	EPA 6010D	8-16-19	8-16-19	
Client ID:	**BH-7 0'-10'Grab**					
Laboratory ID:	08-186-05					
Arsenic	**ND**	11	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.3	EPA 6010D	8-16-19	8-16-19	
Client ID:	**BH-4 0'-10'Grab**					
Laboratory ID:	08-186-06					
Arsenic	**ND**	11	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.7	EPA 6010D	8-16-19	8-16-19	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

TOTAL METALS
EPA 6010D
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0816SM3					
Arsenic	**ND**	10	EPA 6010D	8-16-19	8-16-19	
Lead	**ND**	5.0	EPA 6010D	8-16-19	8-16-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-186-01										
	ORIG	DUP									
Arsenic	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	08-186-01										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**92.2**	**95.6**	100	100	ND	**92**	**96**	75-125	4	20	
Lead	**223**	**227**	250	250	ND	**89**	**91**	75-125	2	20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 14, 2019
Laboratory Reference: 1908-186
Project: 2018-057

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
BH-3 0'-10'Grab	08-186-01	**10**	8-16-19
BH-6 0'-10'Grab	08-186-02	**8**	8-16-19
BH-8 0'-10'Grab	08-186-03	**5**	8-16-19
BH-5 0'-10'Grab	08-186-04	**10**	8-16-19
BH-7 0'-10'Grab	08-186-05	**6**	8-16-19
BH-4 0'-10'Grab	08-186-06	**12**	8-16-19

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 08-186

Company: HWA GeoSciences
Project Number: 2018-057
Project Name: Fire Station 24
Project Manager: Bryan Hawkins
Sampled by: Sean Schlift

Turnaround Request (in working days)
(Check One)
- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals/ MTCA Metals (circle one)	TCLP Metals	HEM (oil and grease) 1664A	Arsenic	Lead					% Moisture
1	BH-3 0'-10' Grab	8/14/19	9:00	Soil	2										X	X	X				X	X					6
2	BH-6 0'-10' Grab	8/14/19	9:50	Soil	2										X	X	X				X	X					6
3	BH-8 0'-10' Grab	8/14/19	10:35		2										X	X	X				X	X					6
4	BH-5 0'-10' Grab	8/14/19	11:35		2										X	X	X				X	X					6
5	BH-7 0'-10' Grab	8/14/19	13:00		2										X	X	X				X	X					6
6	BH-4 0'-10' Grab	8/14/19	13:40		2										X	X	X				X	X					6

	Signature	Company	Date	Time
Relinquished		HWA	8/14/19	15:40
Received		GSE	8/14/19	1540
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☒ _____

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 26, 2019

Bryan Hawkins
HWA GeoSciences, Inc.
21312 30th Drive SE, Suite 110
Bothell, WA 98021

Re: Analytical Data for Project 2018-057
Laboratory Reference No. 1908-210

Dear Bryan:

Enclosed are the analytical results and associated quality control data for samples submitted on August 16, 2019.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

Case Narrative

Samples were collected on August 16, 2019 and received by the laboratory on August 16, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Organophosphorus Pesticides EPA 8270D/SIM Analysis

Samples BH-1 0'-10' Grab, BH-2 0'-10' Grab and the method blank each had one surrogate recovery above control limits. The spike blank and spike blank duplicate had three compounds with recoveries above the control limits. Because these results showed high bias and the samples were all non-detect, no further action was taken.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-1 0'-10' Grab**					
Laboratory ID:	08-210-01					
alpha-BHC	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
gamma-BHC	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
beta-BHC	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
delta-BHC	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
Heptachlor	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
Aldrin	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
Heptachlor Epoxide	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-20-19	8-21-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-20-19	8-21-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endosulfan I	**ND**	5.4	EPA 8081B	8-20-19	8-21-19	
Dieldrin	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endrin	**ND**	11	EPA 8081B	8-20-19	8-21-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endosulfan II	**ND**	11	EPA 8081B	8-20-19	8-21-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Methoxychlor	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Toxaphene	**ND**	54	EPA 8081B	8-20-19	8-21-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*66*	*31-97*				
DCB	*79*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-2 0'-10' Grab**					
Laboratory ID:	08-210-02					
alpha-BHC	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
gamma-BHC	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
beta-BHC	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
delta-BHC	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
Heptachlor	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
Aldrin	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
Heptachlor Epoxide	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
gamma-Chlordane	**ND**	11	EPA 8081B	8-20-19	8-21-19	
alpha-Chlordane	**ND**	11	EPA 8081B	8-20-19	8-21-19	
4,4'-DDE	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endosulfan I	**ND**	5.6	EPA 8081B	8-20-19	8-21-19	
Dieldrin	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endrin	**ND**	11	EPA 8081B	8-20-19	8-21-19	
4,4'-DDD	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endosulfan II	**ND**	11	EPA 8081B	8-20-19	8-21-19	
4,4'-DDT	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endrin Aldehyde	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Methoxychlor	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endosulfan Sulfate	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Endrin Ketone	**ND**	11	EPA 8081B	8-20-19	8-21-19	
Toxaphene	**ND**	56	EPA 8081B	8-20-19	8-21-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*73*	*31-97*				
DCB	*85*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0820S1					
alpha-BHC	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
gamma-BHC	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
beta-BHC	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
delta-BHC	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
Heptachlor	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
Aldrin	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
Heptachlor Epoxide	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
gamma-Chlordane	**ND**	10	EPA 8081B	8-20-19	8-21-19	
alpha-Chlordane	**ND**	10	EPA 8081B	8-20-19	8-21-19	
4,4'-DDE	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Endosulfan I	**ND**	5.0	EPA 8081B	8-20-19	8-21-19	
Dieldrin	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Endrin	**ND**	10	EPA 8081B	8-20-19	8-21-19	
4,4'-DDD	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Endosulfan II	**ND**	10	EPA 8081B	8-20-19	8-21-19	
4,4'-DDT	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Endrin Aldehyde	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Methoxychlor	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Endosulfan Sulfate	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Endrin Ketone	**ND**	10	EPA 8081B	8-20-19	8-21-19	
Toxaphene	**ND**	50	EPA 8081B	8-20-19	8-21-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*74*	*31-97*				
DCB	*100*	*26-105*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOCHLORINE PESTICIDES EPA 8081B SB/SBD QUALITY CONTROL

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0820S2										
	SB	SBD	SB	SBD		SB	SBD				
alpha-BHC	**98.3**	**100**	100	100	N/A	**98**	**100**	55-110	2	15	
gamma-BHC	**95.9**	**97.2**	100	100	N/A	**96**	**97**	55-110	1	15	
beta-BHC	**99.9**	**101**	100	100	N/A	**100**	**101**	50-110	1	15	
delta-BHC	**90.1**	**92.6**	100	100	N/A	**90**	**93**	50-110	3	16	
Heptachlor	**89.2**	**91.3**	100	100	N/A	**89**	**91**	54-111	2	15	
Aldrin	**92.8**	**94.6**	100	100	N/A	**93**	**95**	51-110	2	15	
Heptachlor Epoxide	**94.3**	**95.6**	100	100	N/A	**94**	**96**	49-114	1	15	
gamma-Chlordane	**91.6**	**92.7**	100	100	N/A	**92**	**93**	51-110	1	15	
alpha-Chlordane	**90.9**	**91.2**	100	100	N/A	**91**	**91**	47-114	0	15	
4,4'-DDE	**102**	**104**	100	100	N/A	**102**	**104**	58-110	2	15	
Endosulfan I	**101**	**102**	100	100	N/A	**101**	**102**	56-110	1	15	
Dieldrin	**95.1**	**96.5**	100	100	N/A	**95**	**96**	51-112	1	15	
Endrin	**95.3**	**97.1**	100	100	N/A	**95**	**97**	49-117	2	15	
4,4'-DDD	**96.6**	**99.2**	100	100	N/A	**97**	**99**	56-110	3	15	
Endosulfan II	**93.5**	**94.4**	100	100	N/A	**94**	**94**	51-116	1	15	
4,4'-DDT	**101**	**103**	100	100	N/A	**101**	**103**	51-110	2	15	
Endrin Aldehyde	**87.0**	**82.0**	100	100	N/A	**87**	**82**	54-115	6	15	
Methoxychlor	**101**	**103**	100	100	N/A	**101**	**103**	53-115	2	15	
Endosulfan Sulfate	**89.4**	**90.7**	100	100	N/A	**89**	**91**	52-110	1	15	
Endrin Ketone	**95.6**	**97.4**	100	100	N/A	**96**	**97**	51-112	2	15	
Surrogate:											
TCMX						*76*	*74*	*31-97*			
DCB						*99*	*95*	*26-105*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-1 0'-10' Grab**					
Laboratory ID:	08-210-01					
Dichlorvos(DDVP)	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.054	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.032	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.054	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.054	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.054	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*166*	*26 - 123*				Q
Triphenyl phosphate	*60*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-2 0'-10' Grab**					
Laboratory ID:	08-210-02					
Dichlorvos(DDVP)	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.033	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.056	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.022	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*175*	*26 - 123*				Q
Triphenyl phosphate	*59*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0822S1					
Dichlorvos(DDVP)	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Mevinphos/Phosdrin	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Ethoprophos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Monocrotophos	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Naled	**ND**	0.030	EPA 8270D/SIM	8-22-19	8-23-19	
Sulfotepp	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Phorate	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Dimethoate	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Demeton-S	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Diazinon	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Disulfoton	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-methyl	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Fenchlorphos/Ronnel	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Malathion	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Fenthion	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Parathion-ethyl	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Chlorpyrifos/Dursban	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Trichloronate	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Stirofos/Tetrachlorvinphos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Tokuthion/Prothiofos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Merphos&Merphos-oxone	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Fensulfothion	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Bolstar/Sulprofos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
EPN	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Azinphos-methyl/Guthion	**ND**	0.050	EPA 8270D/SIM	8-22-19	8-23-19	
Coumaphos	**ND**	0.020	EPA 8270D/SIM	8-22-19	8-23-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*145*	*26 - 123*				Q
Triphenyl phosphate	*89*	*47 - 123*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

ORGANOPHOSPHORUS PESTICIDES EPA 8270D/SIM MS/MSD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-186-01										
	MS	MSD	MS	MSD		MS	MSD				
Dichlorvos(DDVP)	**0.0731**	**0.0793**	0.100	0.100	ND	73	79	40 - 125	8	23	
Mevinphos/Phosdrin	**0.0797**	**0.0847**	0.100	0.100	ND	80	85	43 - 102	6	25	
Ethoprophos	**0.0564**	**0.0516**	0.100	0.100	ND	56	52	53 - 106	9	24	I
Sulfotepp	**0.0902**	**0.0760**	0.100	0.100	ND	90	76	60 - 107	17	22	
Phorate	**0.0781**	**0.0881**	0.100	0.100	ND	78	88	51 - 106	12	26	
Dimethoate	**0.0820**	**0.0723**	0.100	0.100	ND	82	72	56 - 107	13	21	
Demeton-S	**0.0685**	**0.0726**	0.100	0.100	ND	69	73	40 - 110	6	26	
Diazinon	**0.0801**	**0.0922**	0.100	0.100	ND	80	92	54 - 105	14	21	
Disulfoton	**0.0804**	**0.0816**	0.100	0.100	ND	80	82	42 - 110	1	22	
Parathion-methyl	**0.0929**	**0.111**	0.100	0.100	ND	93	111	53 - 105	18	24	I
Fenchlorphos/Ronnel	**0.0731**	**0.0795**	0.100	0.100	ND	73	80	53 - 106	8	21	
Malathion	**0.0980**	**0.0859**	0.100	0.100	ND	98	86	58 - 109	13	21	
Fenthion	**0.0675**	**0.0730**	0.100	0.100	ND	68	73	54 - 107	8	22	
Parathion-ethyl	**0.148**	**0.149**	0.100	0.100	ND	148	149	56 - 107	1	23	II
Chlorpyrifos/Dursban	**0.0658**	**0.0714**	0.100	0.100	ND	66	71	53 - 108	8	21	
Trichloronate	**0.0648**	**0.0738**	0.100	0.100	ND	65	74	55 - 106	13	20	
Stirofos/Tetrachlorvinphos	**0.0847**	**0.0890**	0.100	0.100	ND	85	89	41 - 121	5	22	
Tokuthion/Prothiofos	**0.0673**	**0.0688**	0.100	0.100	ND	67	69	53 - 108	2	21	
Fensulfothion	**0.0830**	**0.0892**	0.100	0.100	ND	83	89	39 - 116	7	26	
Bolstar/Sulprofos	**0.0701**	**0.0755**	0.100	0.100	ND	70	76	54 - 108	7	21	
EPN	**0.137**	**0.138**	0.100	0.100	ND	137	138	47 - 115	1	23	II
Azinphos-methyl/Guthion	**0.0839**	**0.0855**	0.100	0.100	ND	84	86	20 - 134	2	24	
Coumaphos	**0.0789**	**0.0815**	0.100	0.100	ND	79	82	42 - 132	3	25	
Surrogate:											
Tributyl phosphate						*153*	*146*	*26 - 123*			**
Triphenyl phosphate						*73*	*68*	*47 - 123*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

CHLORINATED ACID HERBICIDES EPA 8151A

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-1 0'-10' Grab**					
Laboratory ID:	08-210-01					
Dalapon	**ND**	50	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	10	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	1000	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2500	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	76	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.1	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	10	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*68*	*10-114*				
Client ID:	**BH-2 0'-10' Grab**					
Laboratory ID:	08-210-02					
Dalapon	**ND**	51	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	10	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	1000	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2600	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	79	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	10	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	5.3	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	11	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	11	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*78*	*10-114*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

CHLORINATED ACID HERBICIDES EPA 8151A QUALITY CONTROL

Matrix: Soil
Units: ug/Kg (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0819S1					
Dalapon	**ND**	46	EPA 8151A	8-19-19	8-20-19	
Dicamba	**ND**	9.4	EPA 8151A	8-19-19	8-20-19	
MCPP	**ND**	940	EPA 8151A	8-19-19	8-20-19	
MCPA	**ND**	2300	EPA 8151A	8-19-19	8-20-19	
Dichlorprop	**ND**	71	EPA 8151A	8-19-19	8-20-19	
2,4-D	**ND**	9.4	EPA 8151A	8-19-19	8-20-19	
Pentachlorophenol	**ND**	4.8	EPA 8151A	8-19-19	8-20-19	
2,4,5-TP (Silvex)	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
2,4,5-T	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
2,4-DB	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
Dinoseb	**ND**	9.5	EPA 8151A	8-19-19	8-20-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCAA	*71*	*10-114*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-186-01										
	MS	MSD	MS	MSD		MS	MSD				
Dalapon	**94.6**	**85.2**	350	350	ND	**27**	**24**	10-140	10	35	
Dicamba	**164**	**139**	250	250	ND	**65**	**56**	10-136	17	33	
MCPP	**25500**	**22400**	25000	25000	ND	**102**	**90**	40-140	13	35	
MCPA	**22400**	**19100**	25000	25000	ND	**90**	**77**	40-140	16	35	
Dichlorprop	**203**	**177**	250	250	ND	**81**	**71**	40-140	14	35	
2,4-D	**173**	**163**	250	250	ND	**69**	**65**	10-103	6	31	
Pentachlorophenol	**22.8**	**18.6**	25.0	25.0	ND	**91**	**74**	10-124	20	29	
2,4,5-TP (Silvex)	**224**	**200**	250	250	ND	**89**	**80**	40-140	11	35	
2,4,5-T	**200**	**186**	250	250	ND	**80**	**74**	10-118	7	29	
2,4-DB	**248**	**220**	250	250	ND	**99**	**88**	10-143	12	28	
Dinoseb	**213**	**160**	250	250	ND	**85**	**64**	40-140	28	35	
Surrogate:											
DCAA						*83*	*75*	*10-114*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

TOTAL METALS
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BH-1 0'-10' Grab**					
Laboratory ID:	08-210-01					
Arsenic	**ND**	11	EPA 6010D	8-19-19	8-19-19	
Lead	**ND**	5.4	EPA 6010D	8-19-19	8-19-19	
Client ID:	**BH-2 0'-10' Grab**					
Laboratory ID:	08-210-02					
Arsenic	**ND**	11	EPA 6010D	8-19-19	8-19-19	
Lead	**ND**	5.6	EPA 6010D	8-19-19	8-19-19	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

TOTAL METALS
EPA 6010D
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0819SM2					
Arsenic	**ND**	10	EPA 6010D	8-19-19	8-19-19	
Lead	**ND**	5.0	EPA 6010D	8-19-19	8-19-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-210-01										
	ORIG	DUP									
Arsenic	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	08-210-01										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**98.0**	**96.7**	100	100	ND	**98**	**97**	75-125	1	20	
Lead	**225**	**227**	250	250	ND	**90**	**91**	75-125	1	20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Date of Report: August 26, 2019
Samples Submitted: August 16, 2019
Laboratory Reference: 1908-210
Project: 2018-057

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
BH-1 0'-10' Grab	08-210-01	**7**	8-19-19
BH-2 0'-10' Grab	08-210-02	**10**	8-19-19

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: HWA Geosciences
Project Number: 2018-057
Project Name: K24 Fire Station
Project Manager: Bryan Hawkins
Sampled by: Sean Schlitt

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☑ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 08-210

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Arsenic	Lead			% Moisture
1	BH-1 0'-1' Grab	8/16/19	8:05	Soil	2											X	X	X					X	X			X
2	BH-2 0'-1' Grab	1	9:30	1	2											1	1	1					1	1			X

	Signature	Company	Date	Time
Relinquished		HWA	8/16/19	11:05
Received			8/16/19	1105
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☑

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRAFT GEOTECHNICAL REPORT

Fire Station 24 Replacement

Rockery Slope Stability Analyses

Kirkland, Washington

HWA Project No. 2018-057-21

July 14, 2020

Prepared for:

City of Kirkland

HWA GEOSCIENCES INC.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HWA | GeoSciences Inc.
DBE/MWBE

July 14, 2020
HWA Project No. 2018-057-21

City of Kirkland, Public Works Department
123 5th Avenue
Kirkland, Washington 98033

Attention: Anneke J. Davis, P.E., Senior Capital Projects Coordinator

Subject: **Draft Geotechnical Engineering Report**
Fire Station 24 Replacement - Rockery Slope Stability Analyses
Kirkland, Washington

Ms. Davis:

As requested, HWA GeoSciences Inc. (HWA) has completed a geotechnical investigation and slope stability analyses for the Fire Station 24 Replacement project in Kirkland, Washington. This report presents the results of our field explorations, laboratory testing and slope stability analyses.

We appreciate the opportunity to provide geotechnical engineering services on this project. If you have any questions regarding this report or require additional information or services, please contact us at your convenience.

Sincerely,

HWA GeoSciences Inc.

Bryan Hawkins, P.E.
Senior Geotechnical Engineer

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 GENERAL 1

1.2 PROJECT UNDERSTANDING 1

2. FIELD INVESTIGATION 1

2.1 SUBSURFACE EXPLORATIONS 1

2.2 LABORATORY TESTING 2

3. SITE CONDITIONS 2

3.1 GENERAL GEOLOGIC CONDITIONS 2

3.2 SUBSURFACE SOIL CONDITIONS 3

3.3 GROUNDWATER CONDITIONS 4

4. SLOPE STABILITY ANALYSES & CONCLUSIONS 4

4.1 GENERAL 4

4.2 SEISMIC DESIGN CONSIDERATIONS 4

4.2.1 Seismic Design 4

4.2.2 Soil Liquefaction 5

4.3 GLOBAL SLOPE STABILITY EVALUATION 5

4.3.1 Static Slope Stability 7

4.3.2 Pseudo-Static Slope Stability Analyses 7

4.4 CONCLUSIONS 7

5. CONDITIONS AND LIMITATIONS 7

6. REFERENCES 9

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

LIST OF FIGURES (FOLLOWING TEXT)

Figure 1	Vicinity Map
Figure 2	Site and Exploration Plan
Figure 3	Geologic Cross Section A-A'
Figure 4	King County Lidar Image of the Site

Appendices

Appendix A: Field Investigation

Figure A-1	Legend of Terms and Symbols Used on Exploration Logs
Figures A-2 & A-3	Logs of Borings BH-1 and BH-2

Appendix B: Laboratory Testing

Figures B-1	Summary of Material Properties
Figures B-2 & B-3	Particle Size Analysis of Soils
Figures B-4 – B-7	Direct Shear Test of Soils Under Consolidated Drained Conditions

Appendix C: Slope Stability Analyses

Figure 1	Static Scenario with Surcharge
Figure 2	Static Scenario without Surcharge
Figure 3	Pseudo-Static Scenario with Surcharge
Figure 4	Pseudo-Static Scenario without Surcharge

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRAFT GEOTECHNICAL ENGINEERING REPORT
FIRE STATION 24 REPLACEMENT
ROCKERY SLOPE STABILITY ANALYSES
KIRKLAND, WASHINGTON

1. INTRODUCTION

1.1 GENERAL

This report summarizes the results of the geotechnical engineering investigation performed by HWA GeoSciences Inc. (HWA) related to slope stability analyses for the existing rockery along the north property line of the Fire Station 24 property, just south of NE 133rd Place Street, in Kirkland, Washington. The approximate location of the project site is shown on the Vicinity Map, Figure 1 and on the Site and Exploration Plan, Figure 2. Our investigation included drilling two borings near the top of the rockery to evaluate subsurface soil and groundwater conditions. Laboratory tests were conducted on select soil samples to determine relevant engineering properties of the subsurface soils. Static and pseudo-static slope stability analyses were performed on a single cross-section through the slope of the existing rockery, as shown on Figure 2, and Figure 3, Cross Section A-A'.

1.2 PROJECT UNDERSTANDING

As discussed in our Geotechnical Engineering Report for the Fire Station 24 Replacement project (HWA, 2020), the existing rockery along a portion of the west and north property lines was constructed about 50 years ago and has numerous defects is beyond its useful life, though it does not appear to be in danger of catastrophic failure. HWA performed this investigation, at the request of the City of Kirkland, to evaluate soils supported by the rockery and to assess the slope stability. The Fire Station 24 Replacement project is not anticipated to affect the existing rockery and we understand that the rockery will be replaced at a later date and not part of the fire station replacement project.

In Section 85.15 of the KZC, a high landslide area is defined as any area with a slope of 40% or steeper over a height of at least 10 feet. Based on the survey data provided to us for the rockery along the north property line of the site, the height of the rockery plus short concrete retaining wall below is 13 feet and steeper than 40%. Thus, this investigation and evaluation were performed to assess stability of the rockery and slope.

2. FIELD INVESTIGATION

2.1 SUBSURFACE EXPLORATIONS

HWA GeoSciences Inc. (HWA) conducted two geotechnical borings to assess subsurface conditions behind the rockery and to provide parameters for use in slope stability analyses. The locations of the boreholes are shown on the Site Exploration Plan, Figure 2. The borings were

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

drilled by Holocene Drilling, of Puyallup, Washington, under subcontract to HWA on May 15, 2020 using a Diedrich 120 truck-mounted drill rig.

In each boring, Standard Penetration Test (SPT) sampling was performed using a 2-inch outside diameter split-spoon sampler driven by a 140-pound automatic hammer. During the SPT, samples were obtained by driving the sampler 18 inches into the soil with the hammer free-falling 30 inches. The numbers of blows required for each 6 inches of penetration were recorded. The Standard Penetration Resistance ("N-value") of the soil is calculated as the number of blows required for the final 12 inches of penetration. This resistance, or N-value, provides an indication of relative density of granular soils and the relative consistency of cohesive soils, both indicators of soil strength.

A geotechnical engineer from HWA logged the explorations and recorded all pertinent information. Soil samples obtained from the boreholes were classified in the field and representative portions were sealed in plastic bags. Pertinent information including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence was recorded. The soil samples were taken to our Bothell, Washington, laboratory for further examination and testing.

The stratigraphic contacts shown on the individual exploration logs represent the approximate boundaries between soil types; actual transitions may be more gradual. The soil and groundwater conditions depicted are only for the specific date and location reported and, therefore, are not necessarily representative of other locations and times. A legend of the terms and symbols used on the exploration logs is presented in Figure A-1. Summary logs of the borehole explorations are presented in Figures A-2 and A-3.

2.2 LABORATORY TESTING

Geotechnical laboratory tests were conducted on selected samples obtained from the explorations to characterize relevant engineering and index parameters of the soils encountered. The tests included visual classification, natural moisture content determination, grain size distribution and direct shear strength testing. The tests were conducted in the HWA laboratory in general accordance with appropriate American Society of Testing and Materials (ASTM) standards and are discussed in further detail in Appendix B. The test results are presented in Appendix B, and displayed on the exploration logs in Appendix A, as appropriate.

3. SITE CONDITIONS

3.1 GENERAL GEOLOGIC CONDITIONS

The project alignment is located within the Puget Lowland. The Puget Lowland has repeatedly been occupied by a portion of the continental glaciers that developed during the ice ages of the Quaternary period. During at least four periods, portions of the ice sheet advanced south from British Columbia into the lowlands of Western Washington. The southern extent of these glacial

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

advances was near Olympia, Washington. Each major advance included numerous local advances and retreats, and each advance and retreat resulted in its own sequence of erosion and deposition of glacial lacustrine, outwash, till, and drift deposits. Between and following these glacial advances, sediments from the Olympic and Cascade Mountains accumulated in the Puget Lowland. As the most recent glacier retreated, it uncovered a sculpted landscape of elongated, north-south trending hills and valleys between the Cascade and Olympic mountain ranges, composed of a complex sequence of glacial and interglacial deposits.

Geologic information for the project area was obtained from the *Geologic Map of the Kirkland Quadrangle* (Minard, J.P., 1983). This map indicates that the project site is located near mapped deposits of Vashon recessional glacial outwash (Qvr), Vashon advance glacial outwash (Qva), transitional beds (Qtb), and undifferentiated pre-Frasier till (Qtu). Geologic mapping is typically provided based on general boundaries between units that may have shifted with time and development of the Kirkland neighborhood; at a very fine local scale, the general nature of the geologic map referenced may not be accurate to conditions present in subsurface explorations and should only be taken as a guideline for regional deposits. The characteristics of units that we observed at the site are described in the following section.

This map indicates that the project site is positioned near the contact of Vashon recessional outwash soils and Vashon advance outwash soils. Deposits of Vashon recessional outwash generally consist of unsorted, slightly silty to silty sand. Recessional outwash was deposited by meltwater emanating from the retreating glacial ice sheet. Consequently, these deposits have not been overridden by glacial ice and are typically loose to medium dense. Advance outwash was deposited in a braided fluvial system as an alluvial sequence that issued from the front of an advancing glacier and was subsequently glacially-overridden. The overconsolidation and densification results in advance outwash deposits to typically be dense to very dense.

3.2 SUBSURFACE SOIL CONDITIONS

The following units were observed in the exploratory borings performed for this study. Each major soil unit is described below, with materials interpreted as being youngest in origin and nearest to the surface described first.

Fill: Fill soils were encountered in both borings, consisting of loose silty sand with gravel, chunks of concrete with trace organics/wood. The thickness of the fill was about 7.5 feet in both BH-1 and BH-2 and likely placed during original development of the area.

Recessional Outwash: Recessional outwash was encountered in both borings immediately below the fill soils. The thickness of the recessional outwash deposit was about 10 feet in both borings. The recessional outwash soils encountered typically consisted of medium dense, silty sand.

Advance Outwash: Advance outwash deposits were encountered in both borings immediately below the recessional outwash soils to the bottom of each boring at a depth of 31.5 feet. The advance outwash soils encountered typically consisted of dense, silty sand.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.3 GROUNDWATER CONDITIONS

Groundwater seepage was encountered in both borings at a depth of about 25 feet. We anticipate that groundwater levels vary seasonally, with the highest water levels in the wet winter months.

4. SLOPE STABILITY ANALYSES & CONCLUSIONS

4.1 GENERAL

The subsurface explorations indicate that the soils behind the rockery consist of about 7.5 feet of loose, silty sand fill soils overlying medium dense, silty sand (recessional outwash) soils to depths of about 4.5 feet below the base of the wall (wall height approximately 13 feet). Dense, silty sand soils (advance outwash) were encountered below a depth of about 17.5 feet. Our slope stability analyses indicate that the slope/rockery have a static factor of safety of about 1.5 and a pseudo-static factor of safety of about 1.2, as discussed in the sections below.

The pavement along NE 133rd Place, above and behind the rockery and where the borings were drilled, is in predominately good condition with no indications of distresses associated with slope movement or instability. A 3 to 4 feet wide vegetated strip exists between the south side of NE 133rd Place and the chain link fence at the top of the rockery. Review of King County Lidar mapping of the site, presented in Figure 4, shows no indications of landslides or slope stability issues above the rockery.

4.2 SEISMIC DESIGN CONSIDERATIONS

4.2.1 Seismic Design

Earthquake loading for our analyses was developed in accordance with Section 3.4 of the AASHTO *Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition*, 2011 (AASHTO, 2011 with 2012, 2014 and 2015 Interim Revisions) and WSDOT Design Memorandum (WSDOT, 2017). For seismic analysis, the Site Class is required to be established and is determined based on the average soil properties in the upper 100 feet below the ground surface. Based on our explorations and understanding of site geology, it is our opinion that the site is underlain by soils consistent with Site Class C. Therefore, Site Class C should be used with AASHTO seismic evaluations for this project. Table 1 presents recommended seismic coefficients for use with the General Procedure described in AASHTO (2011), which is based upon a design event with a 7 percent probability of exceedance in 75 years (equal to a return period of 1,033 years). The parameters provided were based on the design memorandum from WSDOT, dated January 8, 2017, and using the BridgeLink tool (BridgeLink, 2017) developed by WSDOT.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Table 1.
Seismic Coefficients for Evaluation Using
AASHTO Guide Specifications calculated by USGS Seismic Hazard Map

Site Class	Peak Horizontal Mapped Acceleration PBA, (g)	Spectral Mapped Acceleration at 0.2 sec S_s, (g)	Spectral Mapped Acceleration at 1.0 sec S_1, (g)	Site Coefficients			Peak Horizontal Ground Acceleration PGA, (g)
				F_{pga}	F_a	F_v	
C	0.504	1.253	0.484	1.000	1.000	1.316	0.504

4.2.2 Soil Liquefaction

Soil liquefaction is a phenomenon where loose, saturated, granular deposits temporarily lose strength and behave as a liquid in response to moderate to strong earthquake shaking. Primary factors controlling the development of liquefaction include the intensity and duration of strong ground motions, the characteristics of subsurface soils, in-situ stress conditions and the depth to groundwater. Groundwater was encountered in each boring at a depth of about 25 feet in the dense advance outwash deposit. Therefore, liquefaction is not anticipated and should not affect global slope stability.

4.3 GLOBAL SLOPE STABILITY EVALUATION

As requested, HWA conducted slope stability analyses for the existing rockery at a single location accessible to drilling equipment. The cross-section used for slope stability analyses is shown in Figure 3. The survey data used to generate the cross section was provided to HWA by David Evans and Associates. As indicated in the Rockery Condition Assessment section of our previous geotechnical report (HWA, 2020), the rockery is constructed over an approximately 3 feet high concrete retaining wall. We have no details regarding the configuration of the concrete retaining wall foundations; thus, the rockery was modeled as rock face from top to bottom for conservatism with the base of the rockery at 1 foot below ground surface. The rockery was modeled with a unit weight of 150 pcf, a friction angle of 60 degrees and a cohesion of 200 psf. The fill soils and recessional outwash were modeled using the properties obtained from laboratory direct shear testing. The area immediately in front of the base of the rockery is paved with asphalt. The asphalt layer was not modeled in the slope stability analyses. Picture 1 shows the face of the wall near the location.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Picture 1. Face of rockery near Cross Section A-A' (looking north).

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Slope stability was evaluated using limit equilibrium methods utilizing the computer program SLIDE 5.0 (Rocscience, 2010). Limit equilibrium methods consider force (or moment) equilibrium along potential failure surfaces. Results are provided in terms of a factor of safety, which is computed as the ratio of the summation of the resisting forces to the summation of the driving forces. Where the factor of safety is less than 1.0, instability is predicted. With limit equilibrium, the shear strength available is assumed to mobilize at the same rate at all points along the failure surface. As a result, the factor of safety is constant over the entire failure surface. We used the results of laboratory strength testing to develop parameters for the analyses and analyses were run with no surcharge and with a surcharge value of 250 psf to simulate traffic loading.

4.3.1 Static Slope Stability

The static factors of safety calculated along the geologic profile were evaluated with Spencer's method and Bishop's Simplified method. Both circular and non-linear failure planes were evaluated. The factors of safety, under static loading conditions, were calculated to be 1.319 and 1.366 for cases of surcharge loading and no surcharge loading, respectively, as shown in Appendix C, Figures C-1 and C-2.

4.3.2 Pseudo-Static Slope Stability Analyses

The geologic profile was evaluated using pseudo-static methods to evaluate the response of the slope under earthquake loading. Both Spencer's method and Bishop's Simplified method were used in this evaluation. Pseudo-static slope stability analyses model the anticipated earthquake loading as a constant horizontal force applied to the soil mass. For our analyses, we used a horizontal seismic coefficient of 0.26g, which is one-half of the peak ground acceleration (PGA). The factor of safety of the slopes, under pseudo-static loading conditions, were calculated to be 1.103 and 1.155 for cases of surcharge loading and no surcharge loading, respectively, as shown in Appendix C, Figures C-3 and C-4.

4.4 CONCLUSIONS

Based on the results of our investigations, laboratory testing and slope stability analyses, the existing rockery appears to be stable in its current configuration. However, as indicated in our geotechnical report for the site (HWA, 2020), the rockery is about 50 years old and past its useful life, as evidenced by the presence of weathered rocks, dislodged rocks, over-steepened sections, etc. As indicated in that report, we recommend that the rockery be replaced by a new retaining wall or properly constructed rockery in the near future.

5. CONDITIONS AND LIMITATIONS

We have prepared this report for the City of Kirkland for use in design of this project. The conclusions and interpretations presented in this report should not be construed as our warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Inconsistent conditions can occur between explorations and may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, HWA should be notified for review of the recommendations of this report, and revision of such if necessary.

Within the limitations of scope, schedule and budget, HWA attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology in the area at the time the report was prepared. No warranty, express or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

We appreciate the opportunity to provide geotechnical services on this project. Should you have any questions or comments, or if we may be of further service, please do not hesitate to call.

Sincerely,

HWA GEOSCIENCES INC.

Bryan Hawkins, P.E.
Senior Geotechnical Engineer

Ahmed Mahmoud, E.I.T.
Geotechnical Engineer

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. REFERENCES

Minard, J.P., 1983, *Geologic Map of the Kirkland Quadrangle*, Washington: U.S. Geological Survey, Miscellaneous Field Studies Map MF-1543, scale 1:24,000.

AASHTO, 2017, *LRFD Bridge Design Specification, 8th Edition*, November 2017.

American Association of State Highway and Transportation Officials (AASHTO), 2011, *Guide Specifications for LRFD Seismic Bridge Design*, 2nd Edition, Washington D.C.

American Association of State Highway and Transportation Officials (AASHTO), 2011, *Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition*, with 2012, 2014 and 2015 Interim Revisions, Washington D.C.

BridgeLink, 2017, http://www.wsdot.wa.gov/eesc/bridge/software.

HWA, 2020, *Geotechnical Report Fire Station 24 Replacement, Kirkland, Washington,* dated June 8, 2020.

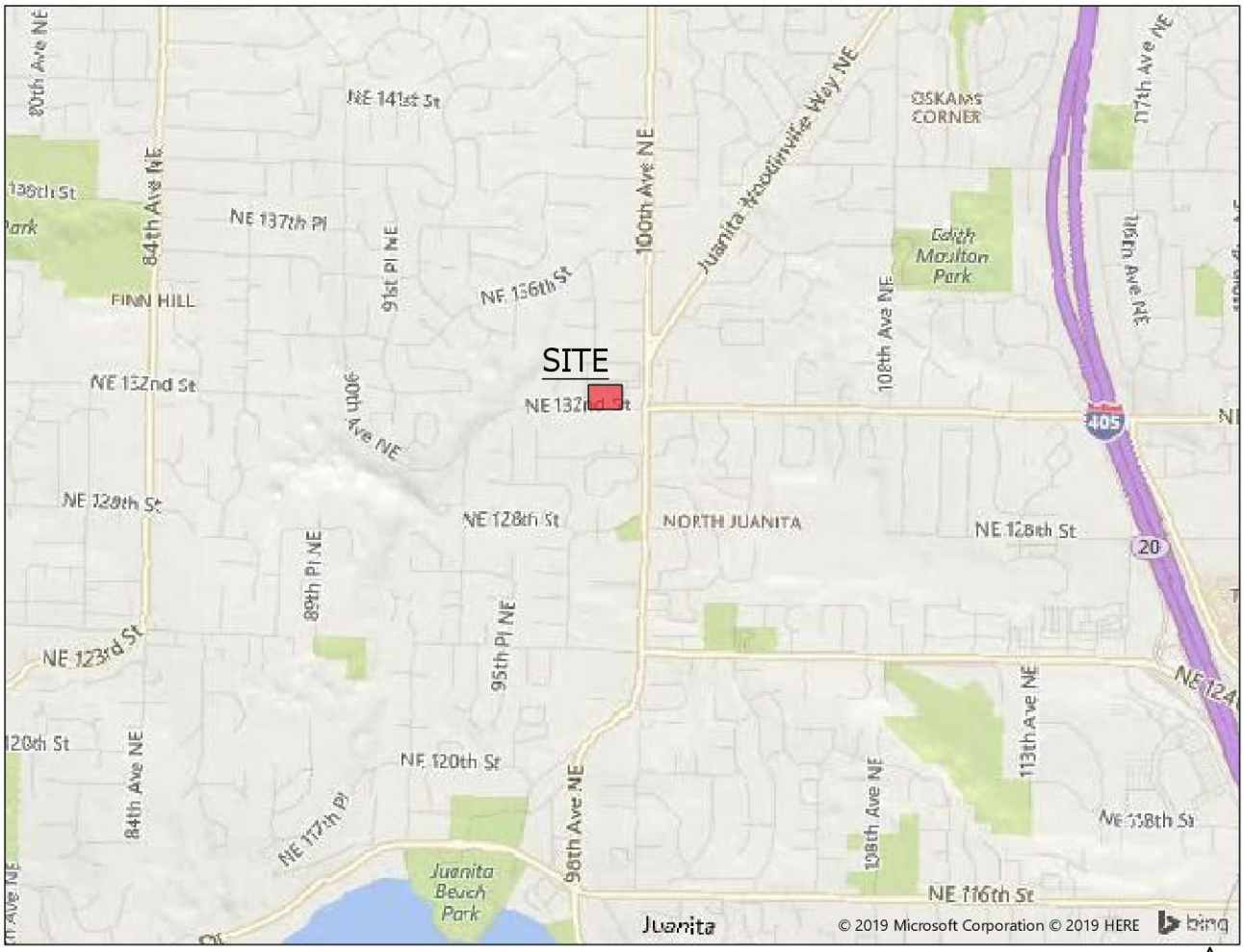
WSDOT, Memo to Designers, 2017, "*AASHTO Guide Specifications for LRFD Seismic Bridge Design Amendments*" dated January 8, 2017.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

SITE MAP

0 200' 400' 600' 800'

SCALE: 1" = 400'



VICINITY MAP

0 1000' 2000' 3000' 4000'

SCALE: 1" = 2000'

HWA GeoSciences Inc.

VICINITY MAP

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

CHECK BY / DRAWN BY	SS / BH BFM
DATE:	
FIGURE #	1
PROJECT #	2018-057-21

S:\2018 PROJECTS\2018-057-21 FIRE STATION 24\CAD\2018-057-21 FIRE STATION #24.DWG <Fig 1> Plotted: 8/29/2019 4:35 PM

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

FIRE STATION #24
Scale: 1" = 40'-0"

EXPLORATION LEGEND

BH-1 BOREHOLE DESIGNATION AND APPROXIMATE LOCATION

A A' GEOLOGIC CROSS SECTION

N

0 20 40 60 80

SCALE: 1" = 40'

BASE MAP PROVIDED BY: BING AND SURVEYOR

C:\USERS\CFRY\DESKTOP\2018-057-21 FIRE STATION 24\CAD\2018-057-21 FIRE STATION #24_05.22.2020.DWG <2> Plotted: 6/26/2020 3:47 PM

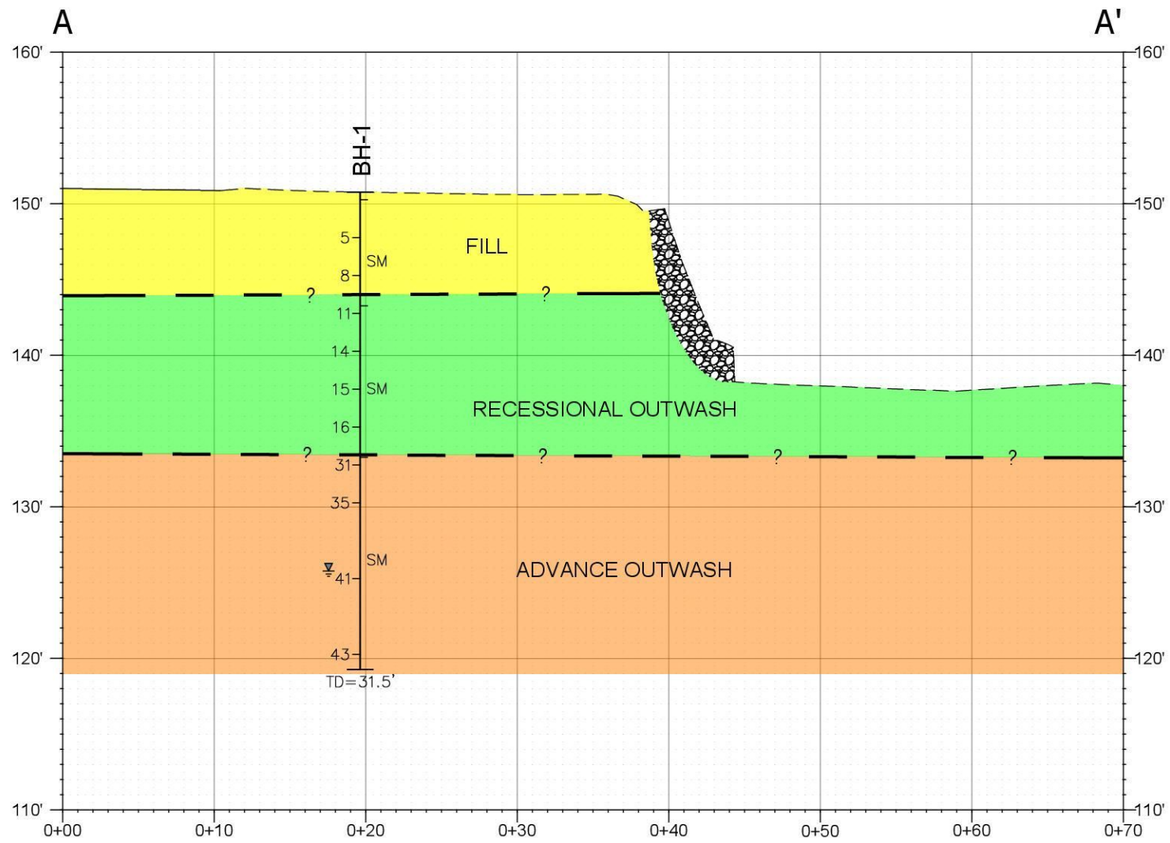
HWA GEOSCIENCES INC.
DBE/MWBE

FIRE STATION #24 REPLACEMENT
ROCKERY SLOPE STABILITY ANALYSES
KIRKLAND, WASHINGTON

SITE &
EXPLORATION PLAN

DRAWN BY:	FIGURE NO.:
CF	2
CHECK BY:	PROJECT NO.:
AM	2018-057-21

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



CROSS SECTION A-A'

BORE LEGEND

BH-1 — EXPLORATION DESIGNATION

BLOW COUNT "N-VALUE "

WATER LEVEL

INFERRED GEOLOGIC CONTACT

BOTTOM OF EXPLORATION

SOILS LEGEND

- FILL
- RECESSIONAL OUTWASH
- ADVANCE OUTWASH

0 5 10 15 20

HORIZ. / VERT. SCALE: 1" = 10'

HWA GEOSCIENCES INC.
DBE/MWBE

FIRE STATION #24 REPLACEMENT
ROCKERY SLOPE STABILITY ANALYSES
KIRKLAND, WASHINGTON

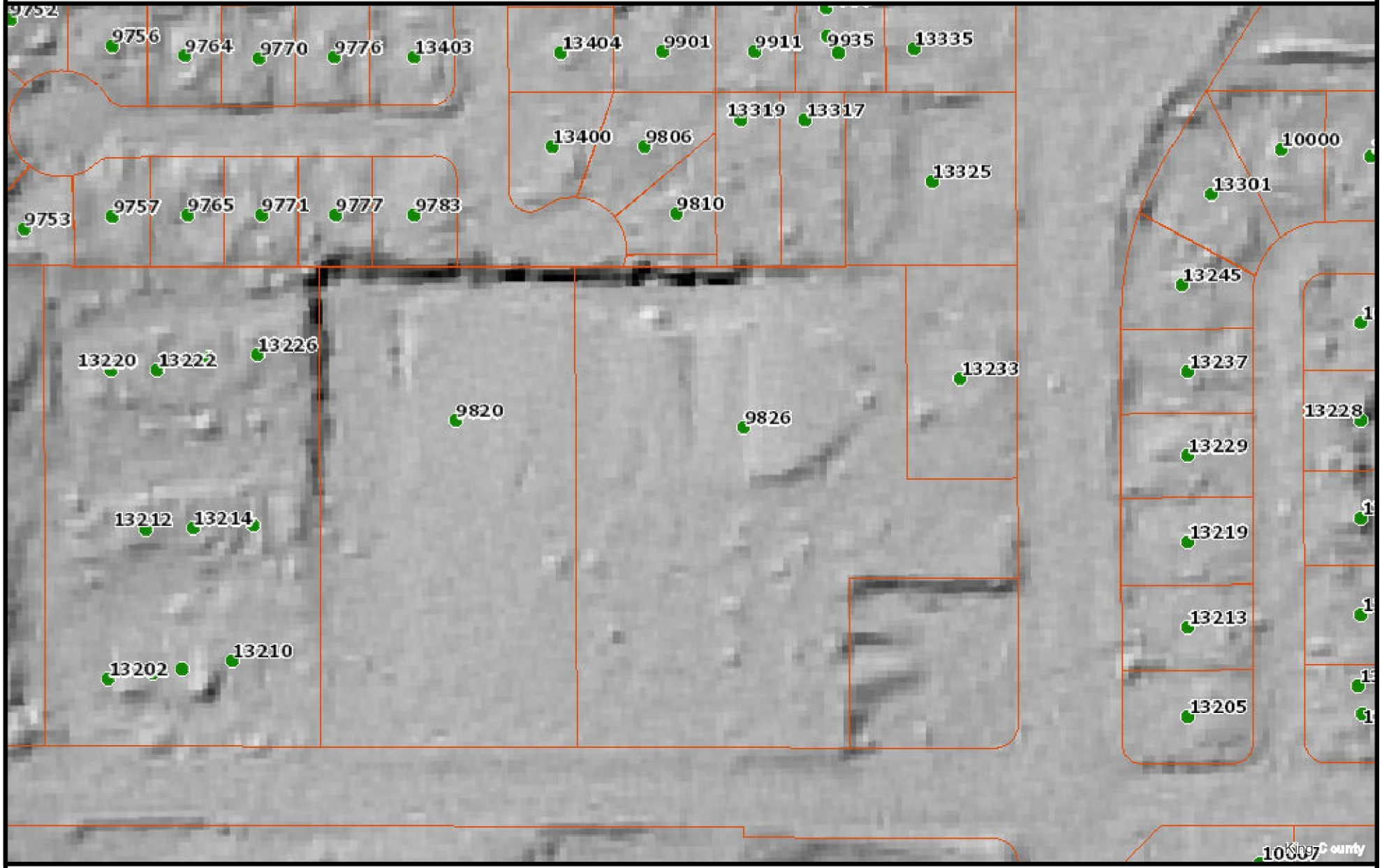
GEOLOGIC CROSS SECTION A-A'

DRAWN BY:	FIGURE NO.:
CF	3
CHECK BY:	PROJECT NO.:
AM	2018-057-21

C:\USERS\CFRY\DESKTOP\2018-057-21 FIRE STATION 24\CAD\2018-057-21 FIRE STATION #24_05.22.2020.DWG <3> Plotted: 6/26/2020 3:38 PM

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

King County iMap



The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a survey product. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

Date: 7/13/2020 Notes:

HWA Figure 4

N

King County

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX A

SUBSURFACE EXPLORATIONS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density(%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

USCS SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP DESCRIPTIONS	
Coarse Grained Soils	Gravel and Gravelly Soils	Clean Gravel (little or no fines)	GW	Well-graded GRAVEL
			GP	Poorly-graded GRAVEL
	More than 50% of Coarse Fraction Retained on No. 4 Sieve	Gravel with Fines (appreciable amount of fines)	GM	Silty GRAVEL
			GC	Clayey GRAVEL
More than 50% Retained on No. 200 Sieve Size	Sand and Sandy Soils	Clean Sand (little or no fines)	SW	Well-graded SAND
			SP	Poorly-graded SAND
	50% or More of Coarse Fraction Passing No. 4 Sieve	Sand with Fines (appreciable amount of fines)	SM	Silty SAND
			SC	Clayey SAND
Fine Grained Soils	Silt and Clay	Liquid Limit Less than 50%	ML	SILT
			CL	Lean CLAY
			OL	Organic SILT/Organic CLAY
50% or More Passing No. 200 Sieve Size	Silt and Clay	Liquid Limit 50% or More	MH	Elastic SILT
			CH	Fat CLAY
			OH	Organic SILT/Organic CLAY
Highly Organic Soils			PT	PEAT

TEST SYMBOLS

%F	Percent Fines	
AL	Atterberg Limits:	PL = Plastic Limit LL = Liquid Limit
CBR	California Bearing Ratio	
CN	Consolidation	
DD	Dry Density (pcf)	
DS	Direct Shear	
GS	Grain Size Distribution	
K	Permeability	
MD	Moisture/Density Relationship (Proctor)	
MR	Resilient Modulus	
PID	Photoionization Device Reading	
PP	Pocket Penetrometer Approx. Compressive Strength (tsf)	
SG	Specific Gravity	
TC	Triaxial Compression	
TV	Torvane Approx. Shear Strength (tsf)	
UC	Unconfined Compression	

SAMPLE TYPE SYMBOLS

- 2.0" OD Split Spoon (SPT) (140 lb. hammer with 30 in. drop)
- Shelby Tube
- 3-1/4" OD Split Spoon with Brass Rings
- Small Bag Sample
- Large Bag (Bulk) Sample
- Core Run
- Non-standard Penetration Test (3.0" OD split spoon)

GROUNDWATER SYMBOLS

- Groundwater Level (measured at time of drilling)
- Groundwater Level (measured in well or open hole after water level stabilized)

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

COMPONENT PROPORTIONS

PROPORTION RANGE	DESCRIPTIVE TERMS
< 5%	Clean
5 - 12%	Slightly (Clayey, Silty, Sandy)
12 - 30%	Clayey, Silty, Sandy, Gravelly
30 - 50%	Very (Clayey, Silty, Sandy, Gravelly)
Components are arranged in order of increasing quantities.	

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation.
Soil descriptions are presented in the following general order:

Density/consistency, color, modifier (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and angularity of constituents, additional comments. (GEOLOGIC INTERPRETATION)

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
MOIST	Damp but no visible water.
WET	Visible free water, usually soil is below water table.

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

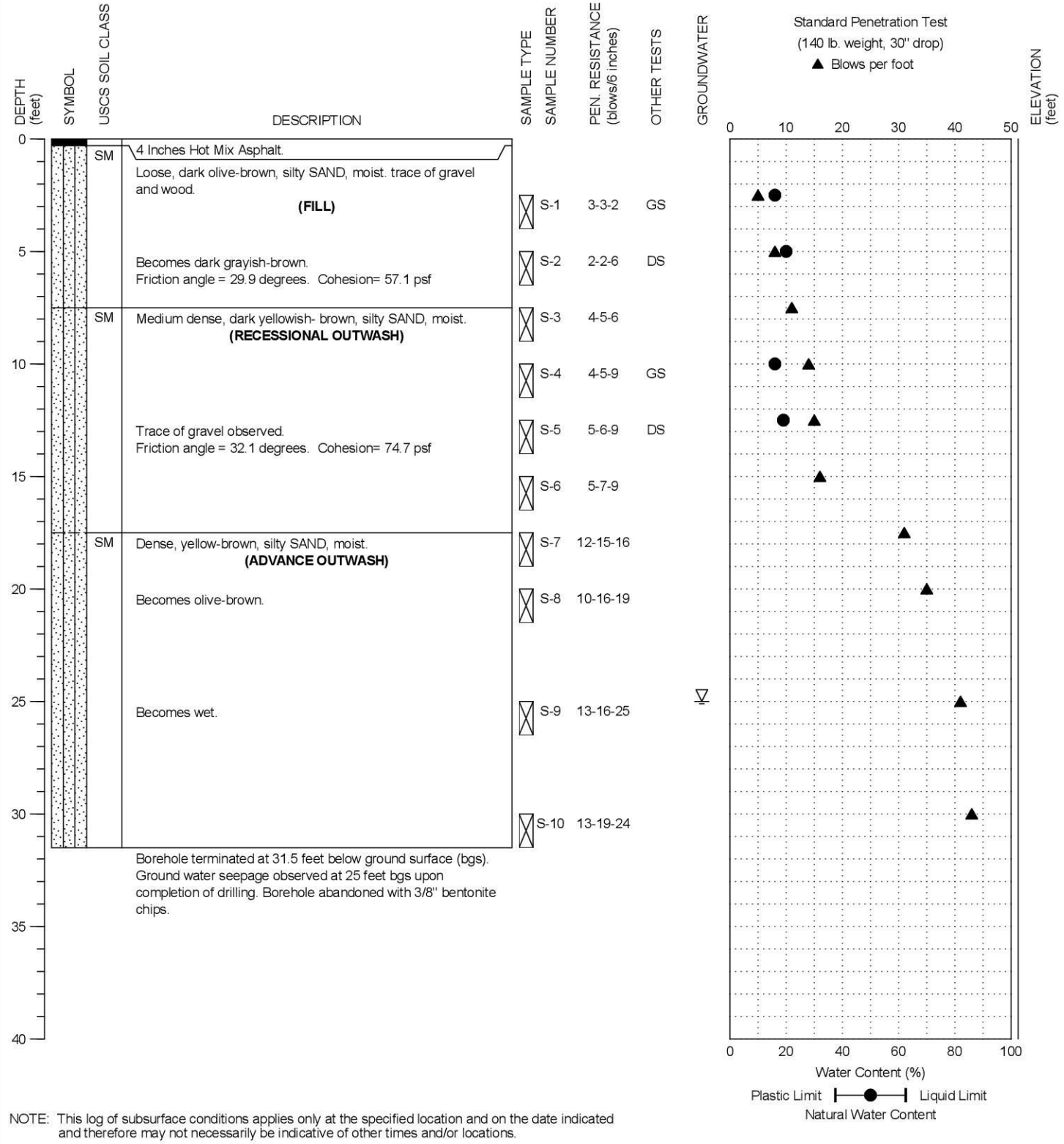
LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 2018-057-21 FIGURE: A-1

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 5/15/2020
DATE COMPLETED: 5/15/2020
LOGGED BY: AM



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

BORING:
BH-1

PAGE: 1 of 1

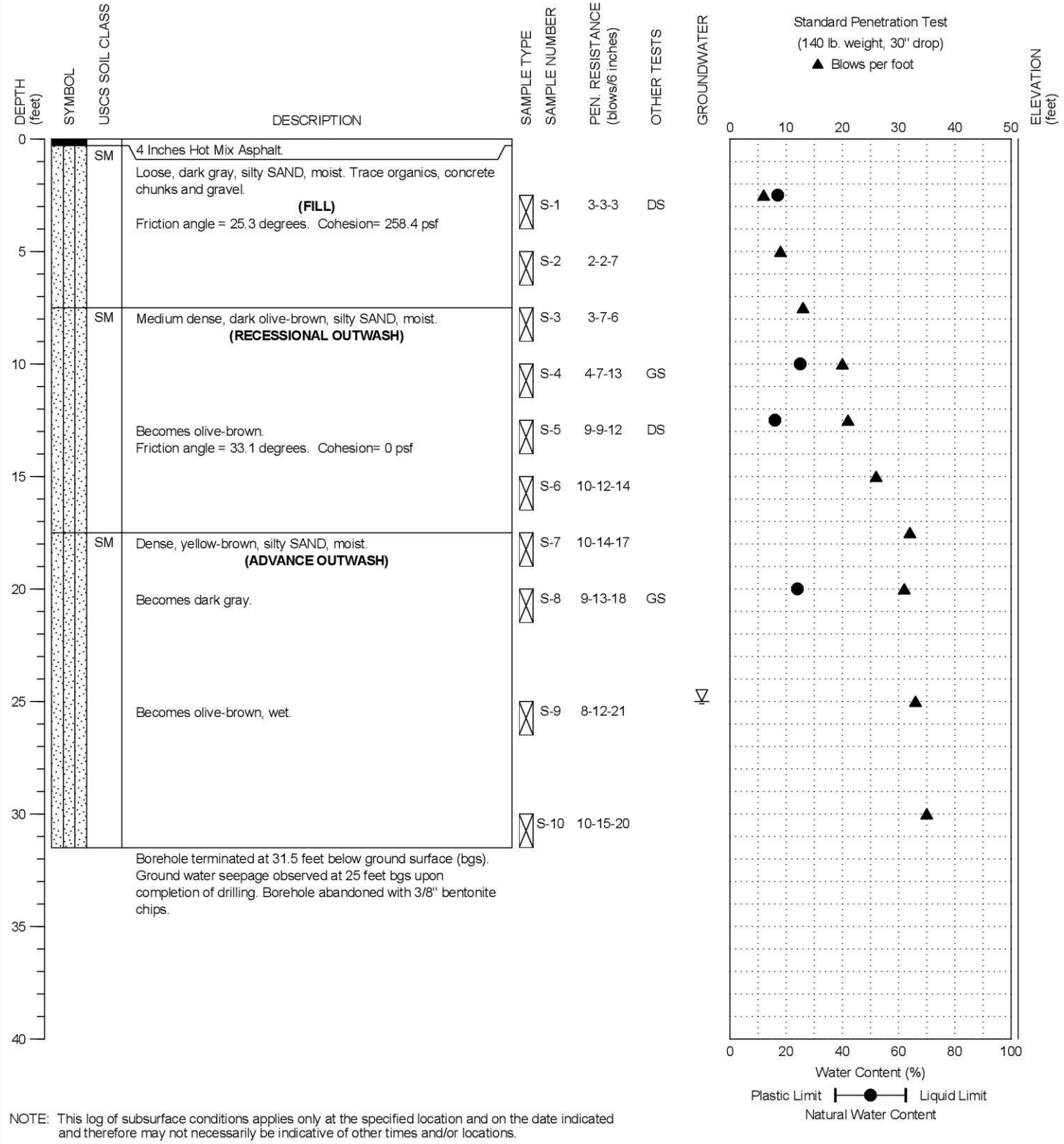
PROJECT NO.: 2018-057-21 FIGURE: A-2

BORING-DSM 2018-057-21 PHASE 2.GPJ 7/14/20

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Truck Mounted Rig
SAMPLING METHOD: SPT, Automatic Hammer
LOCATION: See Figure 2

DATE STARTED: 5/15/2020
DATE COMPLETED: 5/15/2020
LOGGED BY: AM



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

BORING:
BH-2

PAGE: 1 of 1

PROJECT NO.: 2018-057-21 FIGURE: A-3

BORING-DSM 2018-057-21 PHASE 2.GPJ 7/14/20

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX B

LABORATORY TEST RESULTS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX B

LABORATORY TESTING

Representative soil samples obtained from the explorations were placed in plastic bags to prevent loss of moisture and transported to HWA's laboratory in Bothell, Washington, for further examination and testing. Laboratory tests were conducted on selected soil samples to characterize relevant engineering and index properties of the site soils. Laboratory testing was conducted as described below:

MOISTURE CONTENT OF SOIL: The moisture content of selected soil samples (percent by dry mass) was determined in general accordance with ASTM D 2216. The results are shown at the sampled intervals on the appropriate summary logs in Appendix A and the Summary of Material Properties report, Figure B-1.

PARTICLE SIZE ANALYSIS OF SOILS: Selected samples were tested to determine the particle (grain) size distribution of material in general accordance with ASTM D 422 using either the wet sieve or wet sieve and hydrometer methods. The results are summarized on the attached Particle Size Analysis of Soils reports, Figures B-2 and B-3, which also provide information regarding the classification of the sample, and the moisture content at the time of testing.

SHEAR STRENGTH PARAMETERS OF SOIL: A direct shear test was conducted on four select samples, in general accordance with ASTM D 3080. Each sample was remolded to unit weights representative of the SPT blow counts recorded for the sample. The results of these tests are presented on the attached Direct Shear Strength of Soils reports, Figures B-4 through B-7. The apparent cohesion and friction angle of the soil are inferred from a least-squares linear regression of the test points.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
BH-1,S-1	2.5	4.0	15.6						6.6	68.6	24.8	SM	Dark olive-brown, silty SAND
BH-1,S-2	5.0	6.5	19.7									SM	Dark grayish-brown, silty SAND
BH-1,S-4	10.0	11.5	16.4						0.1	83.2	16.8	SM	Dark yellowish-brown, silty SAND
BH-1,S-5	12.5	14.0	19.1									SM	Dark yellowish-brown, silty SAND
BH-2,S-1	2.5	4.0	17.4									SM	Dark gray, silty SAND
BH-2,S-4	10.0	11.5	25.3							86.8	13.2	SM	Dark olive-brown, silty SAND
BH-2,S-5	12.5	14.0	15.9									SM	Olive-brown, silty SAND
BH-2,S-8	20.0	21.5	23.9							86.4	13.6	SM	Dark gray, silty SAND

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

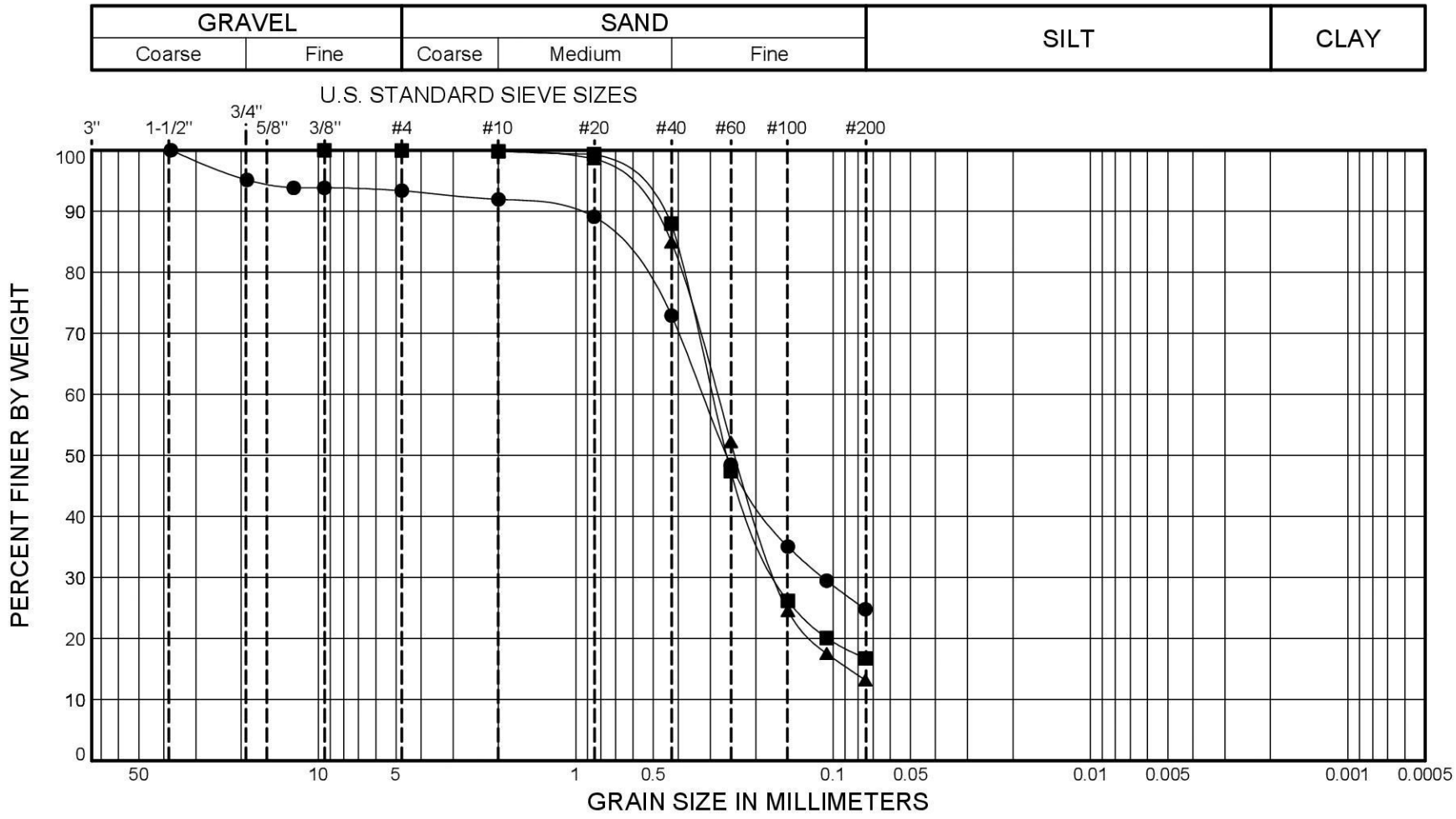
HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

SUMMARY OF MATERIAL PROPERTIES

PROJECT NO.: 2018-057-21 FIGURE: B-1

INDEX MATSUM 2 2018-057-21 PHASE 2.GPJ 5/29/20
Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



SYMBOL	SAMPLE		DEPTH (ft.)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	BH-1	S-1	2.5 - 4.0	(SM) Dark olive-brown, silty SAND	16				6.6	68.6	24.8
■	BH-1	S-4	10.0 - 11.5	(SM) Dark yellowish-brown, silty SAND	16				0.1	83.2	16.8
▲	BH-2	S-4	10.0 - 11.5	(SM) Dark olive-brown, silty SAND	25					86.8	13.2

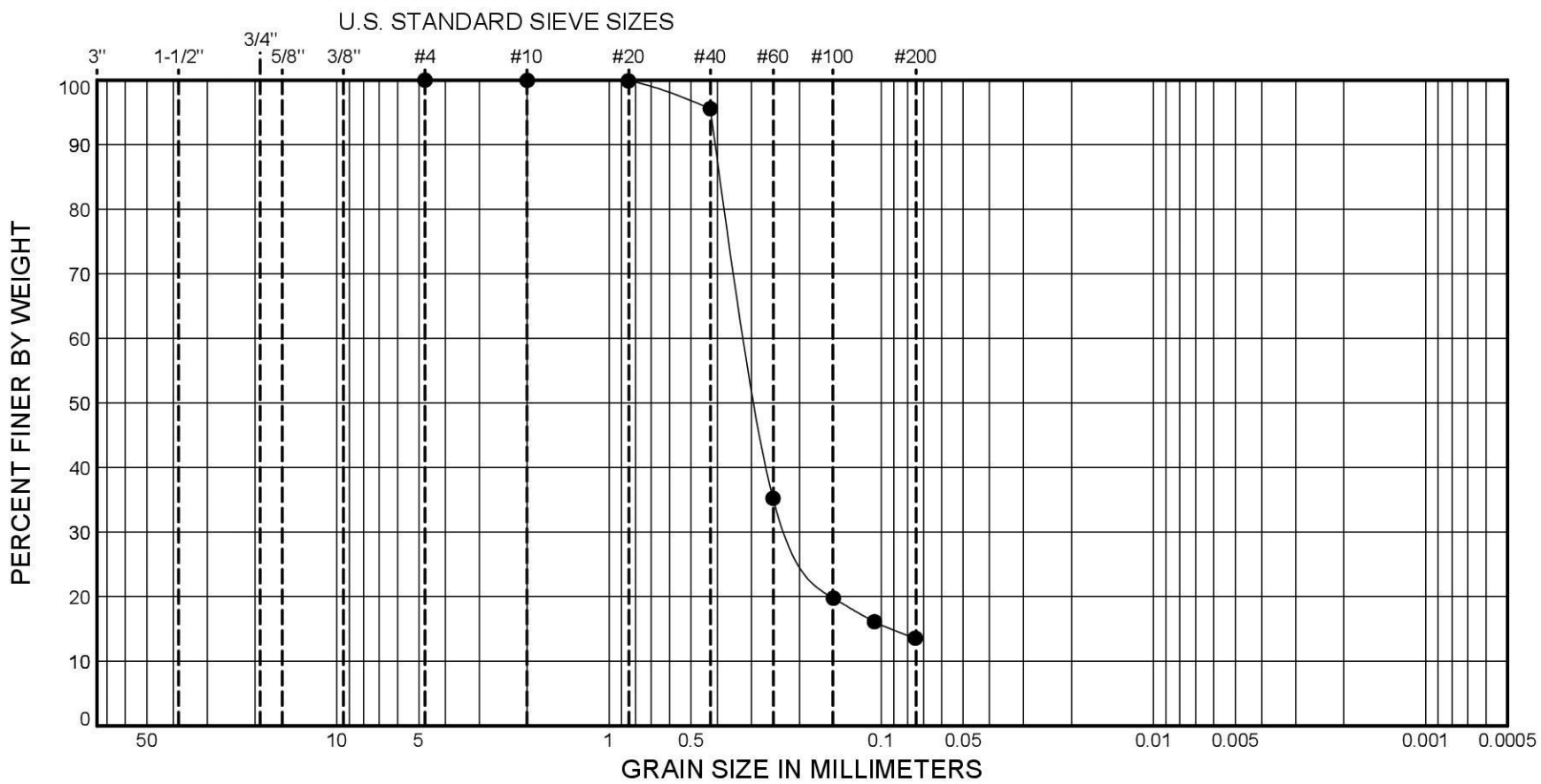
HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D6913

PROJECT NO.: 2018-057-21 FIGURE: B-2

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



SYMBOL	SAMPLE		DEPTH (ft.)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	BH-2	S-8	20.0 - 21.5	(SM) Dark gray, silty SAND	24					86.4	13.6

HWA GEOSCIENCES INC.

FIRE STATION 24 REPLACEMENT
Rockery Slope Stability Analyses
KIRKLAND, WASHINGTON

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D6913

PROJECT NO.: 2018-057-21 FIGURE: B-3

HWAGRSZ 2018-057-21 PHASE 2.GPJ 5/28/20

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HWA GeoSciences Inc. Materials Testing Laboratory

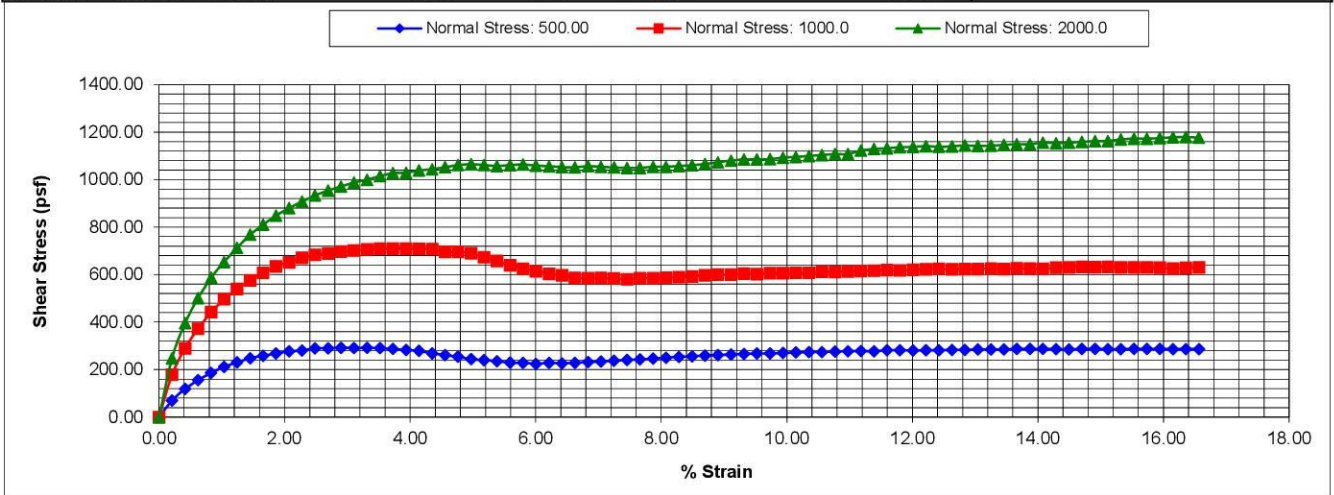
Direct Shear Test of Soils Under Consolidated Drained Conditions (ASTM D 3080)

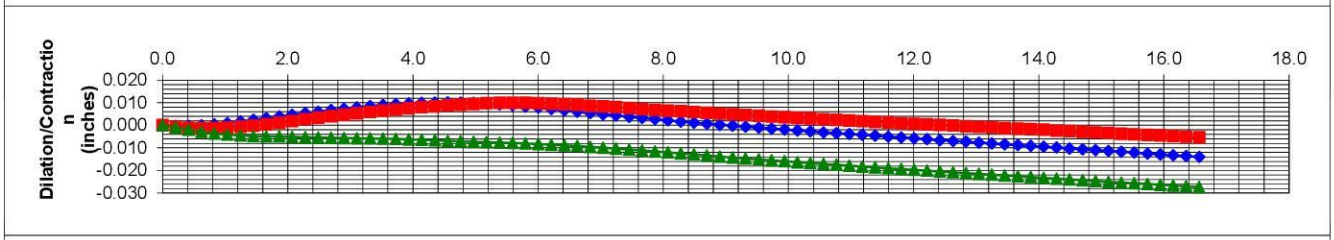
Project Name:	Fire Station 24			**Project Number:**	2018-057
Sample Point:	BH-1	**Sample No.:**	S-2	**Sample Depth:**	5-6.5
Soil Description:	silty SAND				
Soil Color:	Dark Grayish Brown			Average Strain Rate:	0.6 % per min.
Soil Group Symbol:	SM			Soil Specific Gravity:	2.65 (assumed)

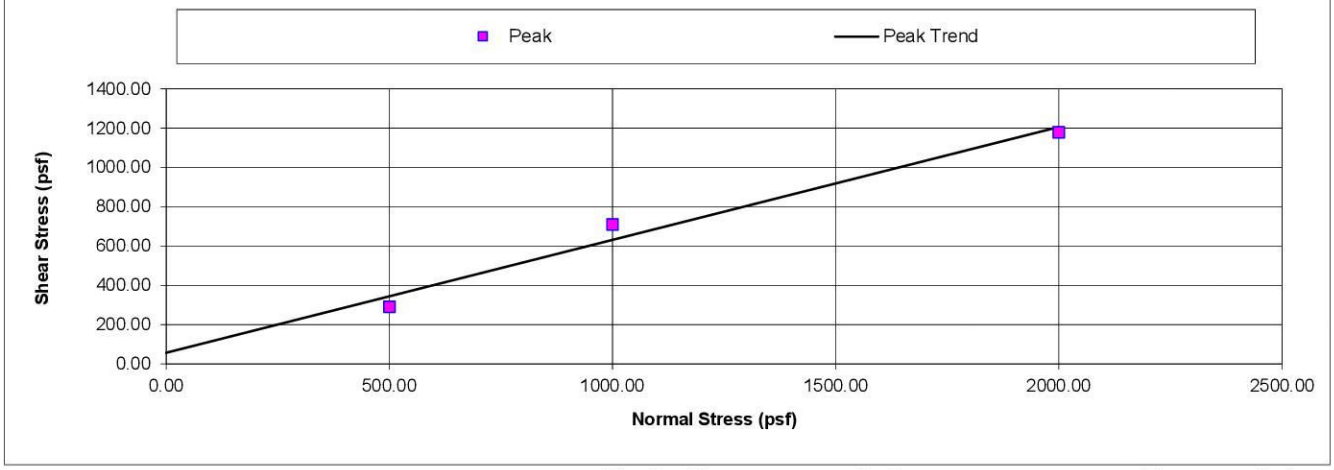
Normal Stress (psf)	500.00	1000.00	2000.00	**Average**
Peak Stress (psf)	291.92	709.60	1179.22	
Initial Moisture Content (%):	19.1	19.1	19.1	19.1
Wet Unit Weight (pcf):	128.0	126.0	126.8	126.9
Dry Unit Weight (pcf):	107.5	105.8	106.5	106.6
Calculated Void Ratio	0.538	0.562	0.552	0.551
Calculated Porosity	0.350	0.360	0.356	0.355
Calculated Saturation (%)	93.8	89.8	91.4	91.7
Final Moisture Content (%)	22.6	22.8	21.6	22.3

Indicated Strength Parameters

	Cohesion psf	phi Angle (degrees)
Peak	57.1	29.9







Checked By: S. Greene Figure B-4

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HWA GeoSciences Inc. Materials Testing Laboratory

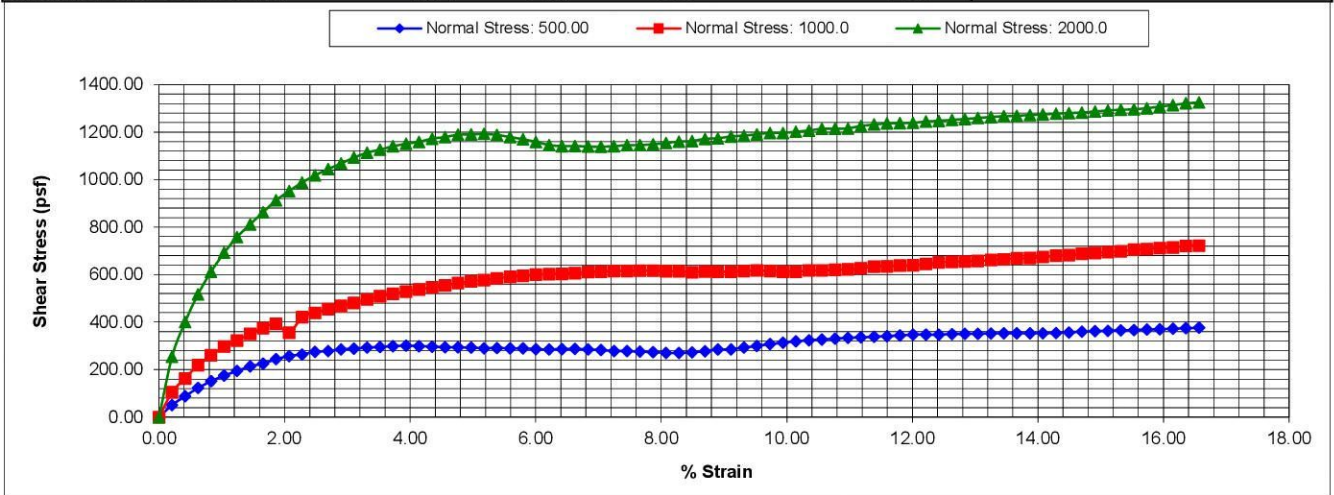
Direct Shear Test of Soils Under Consolidated Drained Conditions (ASTM D 3080)

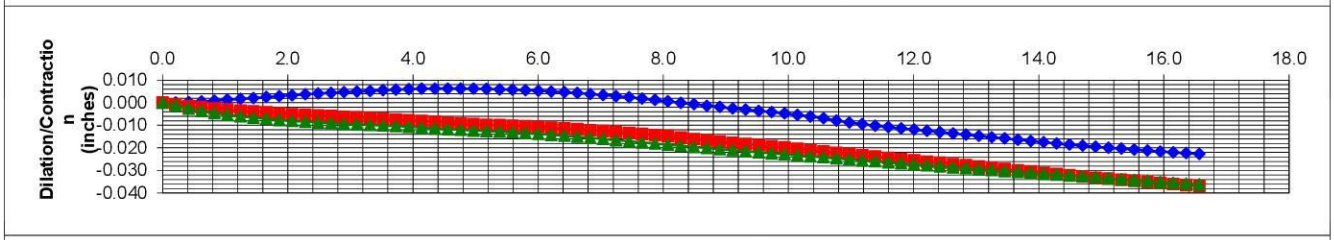
Project Name:	Fire Station 24			**Project Number:**	2018-057
Sample Point:	BH-1	**Sample No.:**	S-5	**Sample Depth:**	12.5-14
Soil Description:	silty SAND				
Soil Color:	Dark Yellowish Brown			Average Strain Rate:	0.5 % per min.
Soil Group Symbol:	SM			Soil Specific Gravity:	2.65 (assumed)

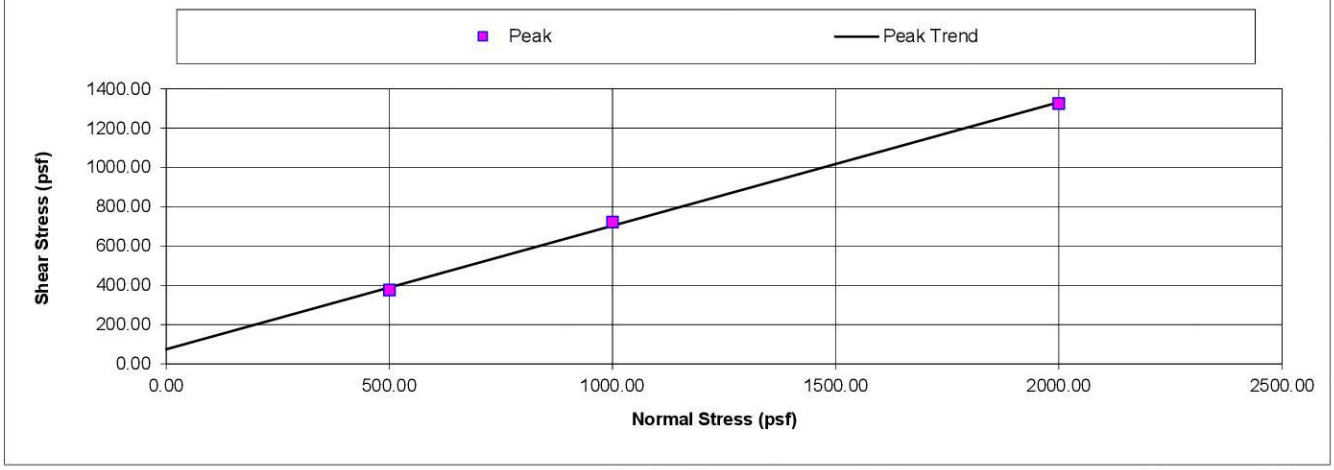
Normal Stress (psf)	500.00	1000.00	2000.00	**Average**
Peak Stress (psf)	376.20	722.02	1325.00	
Initial Moisture Content (%):	19.7	19.7	19.7	19.7
Wet Unit Weight (pcf):	119.9	119.7	120.7	120.1
Dry Unit Weight (pcf):	100.2	100.1	100.9	100.4
Calculated Void Ratio	0.651	0.652	0.639	0.647
Calculated Porosity	0.394	0.395	0.390	0.393
Calculated Saturation (%)	80.1	79.9	81.5	80.5
Final Moisture Content (%)	21.4	21.7	18.2	20.4

Indicated Strength Parameters

	Cohesion psf	phi Angle (degrees)
Peak	74.7	32.1







Checked By: S. Greene Figure B-5

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HWA GeoSciences Inc. Materials Testing Laboratory

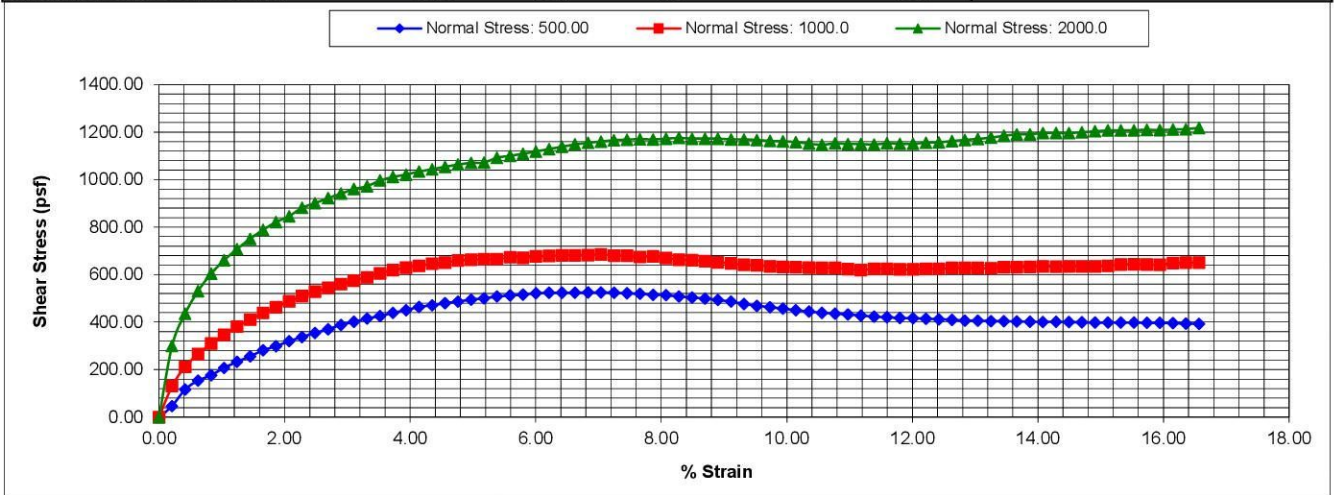
Direct Shear Test of Soils Under Consolidated Drained Conditions (ASTM D 3080)

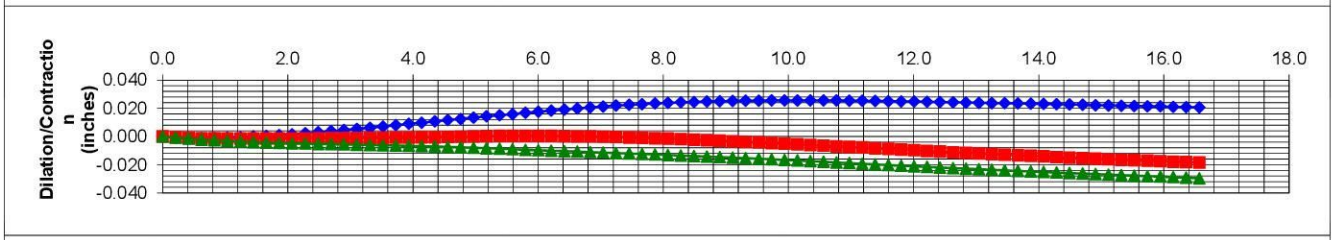
Project Name:	Fire Station 24			**Project Number:**	2018-057
Sample Point:	BH-2	**Sample No.:**	S-1	**Sample Depth:**	2.5-4.0
Soil Description:	silty SAND				
Soil Color:	Dark Gray			Average Strain Rate:	0.6 % per min.
Soil Group Symbol:	SM			Soil Specific Gravity:	2.65 (assumed)

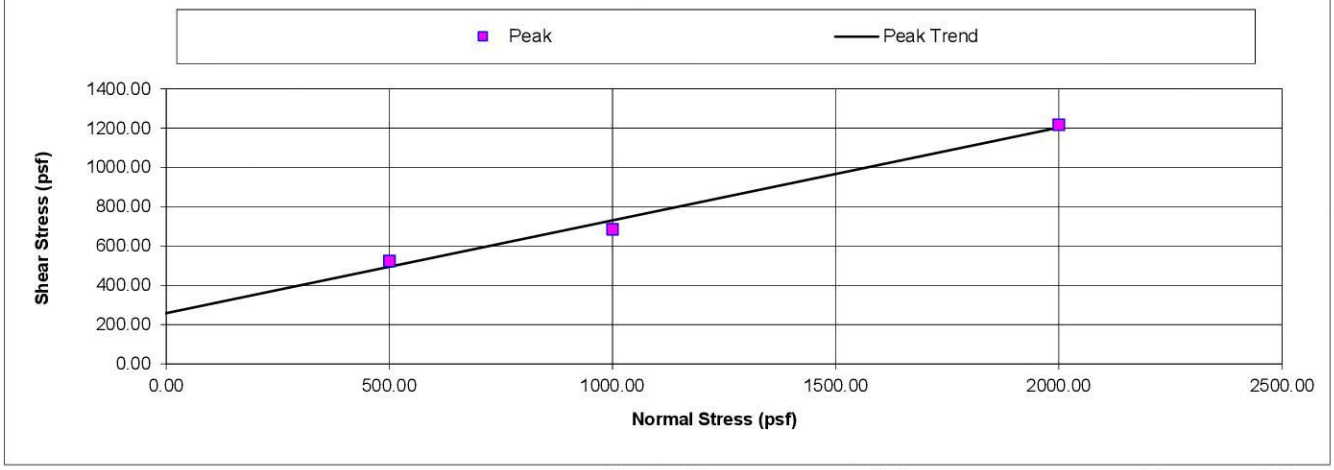
Normal Stress (psf)	500.00	1000.00	2000.00	**Average**
Peak Stress (psf)	524.79	684.91	1217.77	
Initial Moisture Content (%):	17.4	17.4	17.4	17.4
Wet Unit Weight (pcf):	129.5	129.1	129.1	129.2
Dry Unit Weight (pcf):	110.3	110.0	109.9	110.1
Calculated Void Ratio	0.499	0.504	0.504	0.502
Calculated Porosity	0.333	0.335	0.335	0.334
Calculated Saturation (%)	92.4	91.6	91.5	91.8
Final Moisture Content (%)	18.9	18.7	17.7	18.4

Indicated Strength Parameters

	Cohesion psf	phi Angle (degrees)
Peak	258.4	25.3







Checked By: S. Greene Figure B-6

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HWA GeoSciences Inc. Materials Testing Laboratory

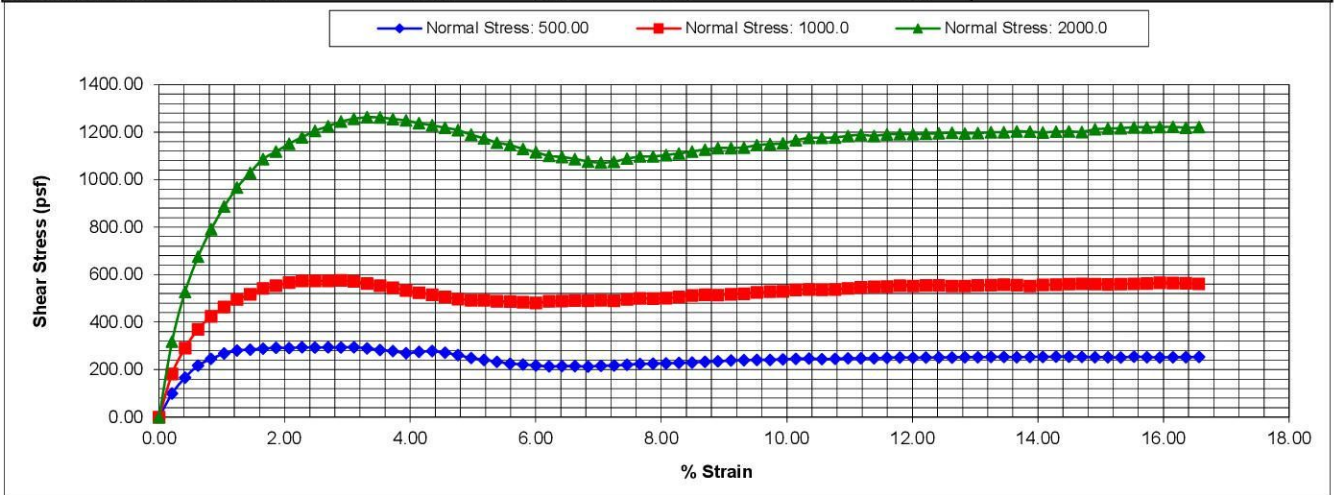
Direct Shear Test of Soils Under Consolidated Drained Conditions (ASTM D 3080)

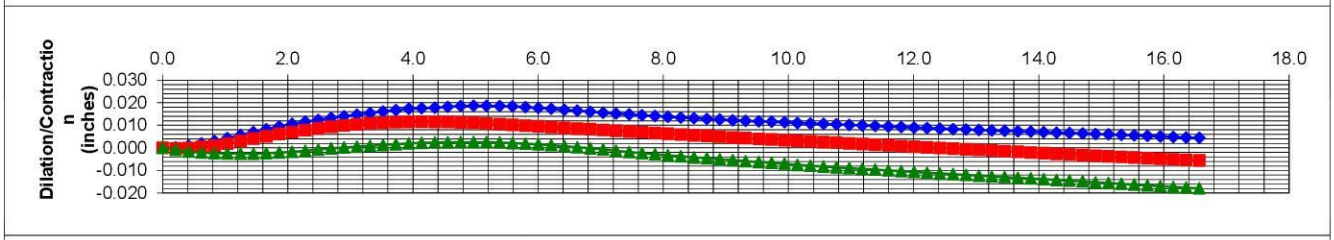
Project Name:	Fire Station 24			**Project Number:**	2018-057
Sample Point:	BH-2	**Sample No.:**	S-5	**Sample Depth:**	12.5-14.0
Soil Description:	silty SAND				
Soil Color:	Olive Brown			Average Strain Rate:	0.6 % per min.
Soil Group Symbol:	SM			Soil Specific Gravity:	2.65 (assumed)

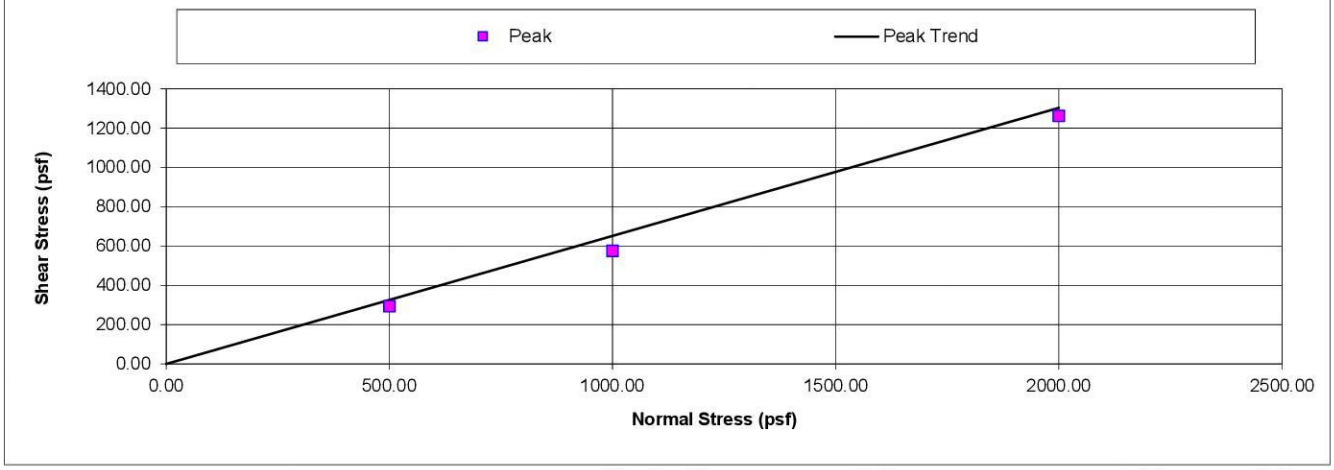
Normal Stress (psf)	500.00	1000.00	2000.00	**Average**
Peak Stress (psf)	294.02	576.00	1262.40	
Initial Moisture Content (%):	15.9	15.9	15.9	15.9
Wet Unit Weight (pcf):	128.3	127.3	127.7	127.8
Dry Unit Weight (pcf):	110.7	109.8	110.1	110.2
Calculated Void Ratio	0.494	0.506	0.501	0.500
Calculated Porosity	0.331	0.336	0.334	0.334
Calculated Saturation (%)	85.4	83.5	84.2	84.4
Final Moisture Content (%)	20.2	19.6	20.4	20.1

Indicated Strength Parameters

	Cohesion psf	phi Angle (degrees)
Peak	0.0	33.1







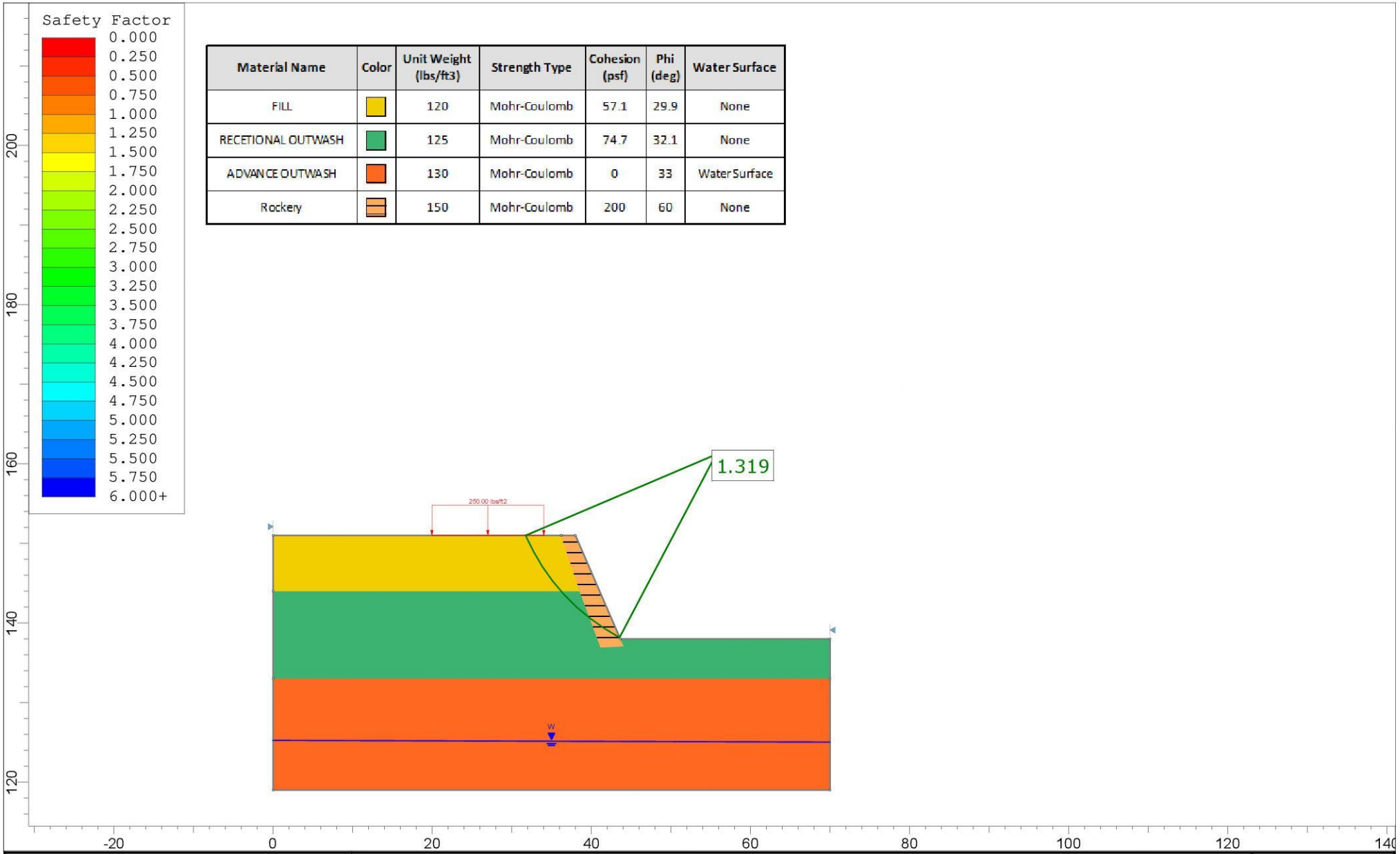
Checked By: S. Greene Figure B-7

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

APPENDIX C

SLOPE STABILITY ANALYSES

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
FILL		120	Mohr-Coulomb	57.1	29.9	None
RECETIONAL OUTWASH		125	Mohr-Coulomb	74.7	32.1	None
ADVANCE OUTWASH		130	Mohr-Coulomb	0	33	Water Surface
Rockery		150	Mohr-Coulomb	200	60	None

HWA GeoSciences Inc. DBE/MWBE

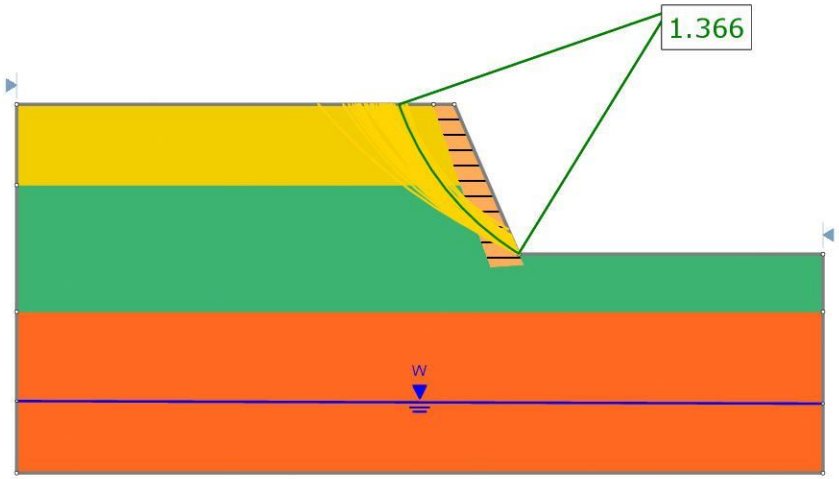
SLIDEINTERPRET 8.020

Project	FIRE STATION 24 REPLACEMENT Rockery Slope Stability Analyses		Figure C-1
Analysis Description	Slope Stability Analysis		
Drawn By	AM	Scale 1:200	Company HWA GeoSciences
Date	7/14/2020		Loading Scenario Static Scenario with Surcharge

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
FILL		120	Mohr-Coulomb	57.1	29.9	None
RECETIONAL OUTWASH		125	Mohr-Coulomb	74.7	32.1	None
ADVANCE OUTWASH		130	Mohr-Coulomb	0	33	Water Surface
Rockery		150	Mohr-Coulomb	200	60	None



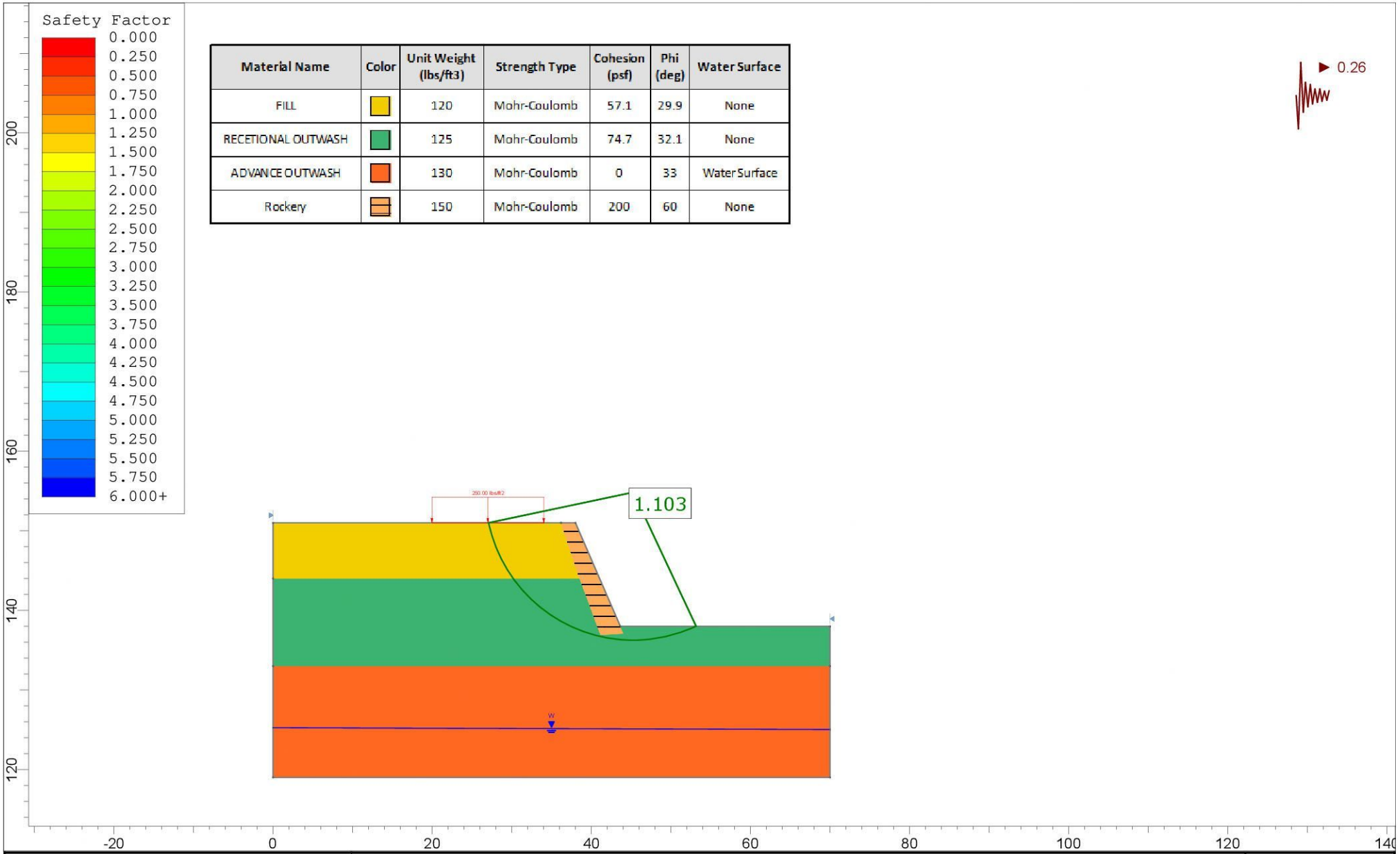
200
180
160
140
120
-20
0
20
40
60
80
100
120

HWA GeoSciences Inc. DBE/MWBE

SLIDEINTERPRET 8.020

Project	FIRE STATION 24 REPLACEMENT Rockery Slope Stability Analyses			Figure C-2
Analysis Description	Slope Stability Analysis			
Drawn By	AM	Scale	1:200	Company HWA GeoSciences
Date	7/14/2020			Loading Scenario Static Scenario without Surcharge

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



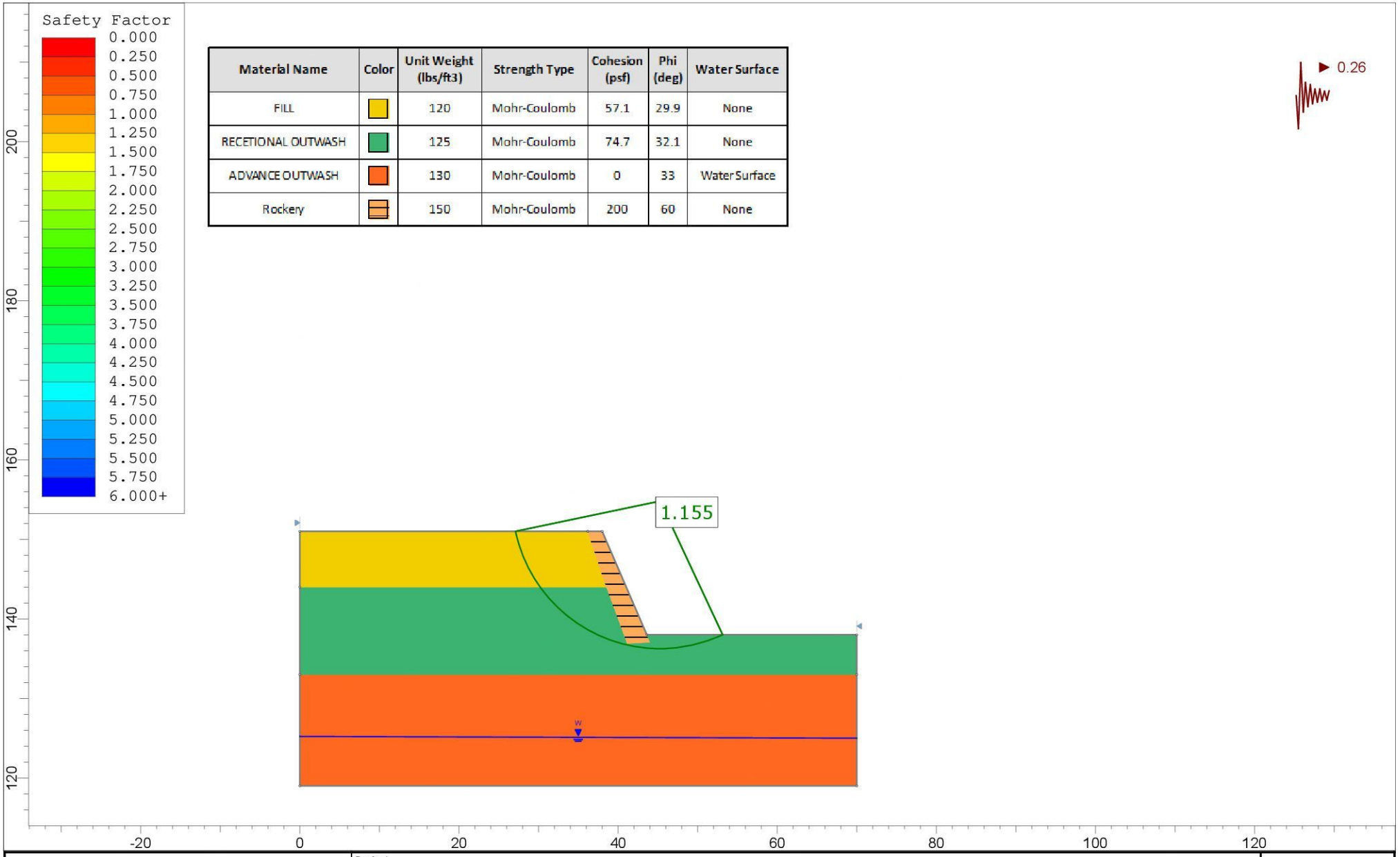
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
FILL		120	Mohr-Coulomb	57.1	29.9	None
RECETIONAL OUTWASH		125	Mohr-Coulomb	74.7	32.1	None
ADVANCE OUTWASH		130	Mohr-Coulomb	0	33	Water Surface
Rockery		150	Mohr-Coulomb	200	60	None

HWA GeoSciences Inc. DBE/MWBE

SLIDEINTERPRET 8.020

Project	FIRE STATION 24 REPLACEMENT Rockery Slope Stability Analyses		Figure C-3
Analysis Description	Slope Stability Analysis		
Drawn By	AM	Scale 1:200	Company HWA GeoSciences
Date	6/24/2020		Loading Scenario Pseudo-Static Scenario with Surcharge

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal



HWA GeoSciences Inc. DBE/MWBE	Project	FIRE STATION 24 REPLACEMENT Rockery Slope Stability Analyses		Figure C-4
	Analysis Description	Slope Stability Analysis		
	Drawn By: AM	Scale: 1:200	Company: HWA GeoSciences	
SLIDEINTERPRET 8.020	Date: 6/24/2020		Loading Scenario: Pseudo-Static Scenario without Surcharge	

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BID FORM

Bidder's Firm Name:_____ Date:_____

Address:_____

_____

Telephone No.:_____

TO: City of Kirkland
123 5th Avenue
Kirkland, WA 98033

Fire Station 24
9824 NE 132ND ST, Kirkland, WA 98034
CIP NO. PSC 3002 200
JOB NO. 32-20-PW

GENERAL PROPOSAL

The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this proposal are those named herein; that this proposal is in all respects fair and without fraud; that it is made without collusion with any official or employee City of Kirkland; and that the proposal is made without any connection or collusion with any person making another proposal on this contract.

The Bidder further declares that they have carefully examined the contract documents for the construction of the project; that they have personally inspected the site; that they have satisfied themselves as to the quantities involved, including materials and equipment and conditions of work involved, including the fact that the description of the quantities of work materials, as included herein, is brief and is intended only to indicate the general nature of the work and to identify the said quantities with the detailed requirements of the contract documents; and that this proposal is made according to the provisions and under the terms of the contract documents, which documents are hereby made a part of this proposal.

The Bidder further agrees that they have exercised their own judgment regarding the interpretation of subsurface information and have utilized all data which they believe is pertinent from the Architect, Owner and other sources in arriving at his/her conclusions.

The Bidder agrees to hold their bid proposal open for sixty (60) days after the actual date of bid opening and to accept the provisions of the Instructions to Bidders regarding disposition of bid bond.

The Bidder agrees that if this bid is accepted through Award of Contract by Council, it will, within ten (10) calendar days after notification of acceptance, execute the contract with the Owner in the form of contract included in the contract documents, and will, at the time of execution of the Contract, deliver to the Owner the Performance and Payment Bonds and all Certificates of Insurance required therein, and will, to the extent of its proposals, furnish all machinery, tools, apparatus, and other means of construction and do the work in the manner, in the time, and according to the requirements as specified in the contract documents and required by the engineer/architect or other project manager designated thereunder.

TIME OF COMPLETION:

The Owner can issue Notice to Proceed at any time after contract execution. The undersigned understands

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BID FORM

and agrees that Substantial Completion of the work shall be no later than 365 consecutive calendar days after the Notice to Proceed, and that Final Completion of the work shall be no later than 45 consecutive calendar days after Substantial Completion.

PERMITS, FEES AND INSPECTIONS:

The Owner will apply for and pay for the general building permit and the NUD utility permit. The contractor is required to meet the requirements and conditions of any owner-procured permits, to post the permits, and for the scheduling and inspections related to these permits. The City of Kirkland has secured NPDES coverage under the Ecology Construction Stormwater General Permit, and will transfer that coverage, and responsibility for any associated fees, to the Contractor. The Contractor is responsible for all other required permits for the project in their entirety: including, but not limited to, the plumbing, electrical, mechanical, and utility permits. A City right-of-way permit is not required to be applied for or paid for as this is a City project, although the Contractor will need to comply with requirements of working in the right of way, such as, but not limited to, having an approved traffic control plan. Utility connection fees, if incurred by the contractor to facilitate the work, shall be paid back to the contractor by the Owner within the contact document change order process without markup of any kind. All other City of Kirkland and other State of Washington or local agency permits and requirements are the financial and administrative responsibility of the Contractor at no cost to the City of Kirkland.

BASE BID:

The Bidder further proposes to accept as full payment for the work proposed herein the amounts computed under the provisions of the contract documents and based upon the bid price for fully completed work as included in the proposal and the Bid Price represents a true measure of the labor, equipment, and materials required to perform and complete the work, including all allowances for overhead and profit for each type of work called for in these contract documents, as well as all use taxes, overhead, profit, bond premiums, insurance premiums and all other miscellaneous and incidental expenses. The amounts shall be shown in both words and figures. In case of discrepancy, the amount shown in words shall govern.

The undersigned bids for complete construction of the Fire Station 24 Project as follows:

For the **Total for Base Bid,** which does not include Washington State sales tax, the sum of:

_____ DOLLARS
(Please print dollar amount in words in space above.)

$_____
(Please write dollar figure in numerals in space above.)

TRENCHING

Trenching is included in the Total for Base Bid above. The bidder shall enter in the blank space provided below; the dollar amount (in numbers) the bidder has included in its Total for Base Bid for any work requiring trenching that will exceed a depth of 4'-0" per Chapter 49.17 RCW. If trenching excavation safety provisions do not pertain to the project the Bidder should enter "N.A." or "Not Applicable" in the following blank $_____. **The bidder must fill in the blank.**

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BID FORM

ALTERNATE BIDS

Alternate #1 Remove the detention pond as shown in the Drawings and Specifications and replace with the detention vault as shown in the Drawings and Specifications. **Bidder shall provide the differential amount to the Total Base Bid to accomplish Alternate #1. The bidder must bid on Alternate #1.**

The undersigned bids for complete construction of Alternate #1 (Detention Vault) for a differential amount to the Total for Base Bid, which does not include Washington State sales tax, the sum of:

_____ DOLLARS
(Please print dollar amount in words in space above.)

$_____
(Please write dollar figure in numerals in space above.)

LUMP SUM and UNIT PRICE ALLOWANCES (Refer to Section 01 21 00 for description of Allowances):

The Undersigned certifies that the sums specified as lump sum allowances and unit price allowances for the provision of items and work as specified in Section 01 21 00 – Allowances, are included in the Total Base Bid.

LUMP SUM ALLOWANCES

1.	Additional Exterior Signage	$5,000
2.	Additional Interior Signage	$2,500
3.	Parking Lot Restriping (Goodwill Parking Lot)	$9,200
4.	Moisture Barrier	$2,400

UNIT PRICES (Refer to Section 01 22 00 for description of Unit Prices):

1. Unit Price/Bank cubic yard for Over-excavation and replacement of Unsuitable Soil:

Bid w/o Sales Tax $_____/bank cu. yd
(Please write dollar figure in space above –in numbers)

Multiply Unit Price 1 Bid X 250 (250 does not reflect anticipated quantity; the product of the unit price bid and 250 shall be used for the evaluation of low bid).

$_____
(Please write dollar figure in space above –in numbers)

2. Unit Price/Bank cubic yard for Over-excavation and replacement of Contaminated Soils:

Bid w/o Sales Tax $_____/bank cu. yd
(Please write dollar figure in space above –in numbers.)

Multiply Unit Price 2 Bid X 250 (250 does not reflect anticipated quantity; the product of the unit price bid and 250 shall be used for the evaluation of low bid).

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BID FORM

$_____
(Please write dollar figure in space above –in numbers.)

3. Unit Price No. 3: Rock Removal and replacement with satisfactory soil material.

Bid w/o Sales Tax $_____/bank cu. yd
(Please write dollar figure in space above –in numbers.)

Multiply Total for Unit Price 3 Bid X 250 (250 does not reflect anticipated quantity; the product of the unit price bid and 250 shall be used for the evaluation of low bid).

$_____
(Please write dollar figure in space above –in numbers.)

4. Unit Price No.4: Provision of Controlled Density Fill (CDF) in locations as authorized by the Owner:

Bid w/o Sales Tax $_____/cu. yd
(Please write dollar figure in space above –in numbers.)

Multiply Total for Unit Price 4 Bid X 250 (250 does not reflect anticipated quantity; the product of the unit price bid and 250 shall be used for the evaluation of low bid).

$_____
(Please write dollar figure in space above –in numbers.)

ADDENDA

Receipt of the following Addenda is hereby acknowledged.

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Addendum No. _____ dated _____

BID REVIEW MEETING:

The Undersigned agrees that if they are the successful bidder, they will be available for a bid review meeting with the Architect and the Owner at the Owner's office, at a time to be agreed upon.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BID FORM

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

I certify (or declare) under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct:

_____
CONTRACTOR (Firm Name)

_____ _____
By (Signature) Printed Name/Title of Signatory

_____
(Indicate whether Contractor is Partnership,

_____ _____
Washington State Contractor's Registration Number

Contractor's Industrial Insurance Account Number

Contractor's Address:

_____ _____
Telephone Number

_____ _____
Fax Number

BID FORM TO BE SUBMITTED IN A SEALED ENVELOPE
END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BID DEPOSIT

Herewith find deposit in the form of a cashier's check or certified check in the amount of $_____which amount is not less than five percent (5%) of the total bid.

SIGN HERE_____

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, and _____, as Surety, are held and firmly bound unto the City of Kirkland, as Obligee, in the penal sum of _____ _____ dollars, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

The condition of this obligation is such that if the Obligee shall make any award to the Principal for

_____ _____
Project Name Job Number

according to the terms of the proposal or bid made by the Principal therefor, and the Principal shall duly make and enter into a contract with the Obligee in accordance with the terms of said proposal or bid and award and shall give bond for faithful performance thereof, with Surety or Sureties approved by the Obligee; or if the Principal shall, in case of failure to do so, pay and forfeit to the Obligee the penal amount of the deposit specified in the call for bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the Surety shall forthwith pay and forfeit to the Obligee, as penalty and liquidated damages, the amount of this bond.

SIGNED, SEALED AND DATED THIS _____ DAY OF _____, 20_____.

PRINCIPAL: SURETY:

_____ _____

_____ _____

Note: If a Bid Bond is provided, it must be accompanied by a power of attorney which appoints the Surety's true and lawful attorney-in-fact to make, execute, seal and deliver this Bid Bond.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
SUBCONTRACTOR IDENTIFICATION FOR CONTRACTS ESTIMATED TO BE IN EXCESS OF ONE MILLION DOLLARS ($1,000,000.00)

RCW 39.30.060 requires the following:

> "(1) Every invitation to bid on a prime contract that is expected to cost one million dollars or more for the construction, alteration, or repair of any public building or public work of the state or a state agency or municipality as defined under RCW 39.04.010 … shall require each prime contract bidder to submit:
>
> (a) **Within one hour after the published bid submittal time**, the names of the subcontractors with whom the bidder, if awarded the contract, will subcontract for performance of the work of: HVAC (heating, ventilation, and air conditioning); plumbing as described in chapter 18.106 RCW; and electrical as described in chapter 19.28 RCW, or to name itself for the work; or
>
> (b) **Within forty-eight hours after the published bid submittal time**, the names of the subcontractors with whom the bidder, if awarded the contract, will subcontract for performance of the work of structural steel installation and rebar installation.
>
> The prime contract bidder shall not list more than one subcontractor for each category of work identified, unless subcontractors vary with bid alternates, in which case the prime contract bidder must indicate which subcontractor will be used for which alternate. Failure of the prime contract bidder to submit as part of the bid the names of such subcontractors or to name itself to perform such work or the naming of two or more subcontractors to perform the same work shall render the prime contract bidder's bid non-responsive and, therefore, void."

To turn in this Subcontractor Identification form, please utilize the RING doorbell at the North entrance of City Hall, 123 5th Avenue, Kirkland, WA 98033. A City employee will accept, and date/time stamp the form.

Each bidder shall submit a list of:

1. HVAC, plumbing, electrical, structural steel installation, and rebar installation subcontractors; and

2. The specific items of work those subcontractors will perform on the contract; and

3. The specific items of work that will be performed by the bidder on the contract relating to work described in RCW 39.30.060.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CITY OF KIRKLAND
SUBCONTRACTOR IDENTIFICATION LIST

*REQUIRED IF ESTIMATE AMOUNT EXCEEDS $1,000,000 (*Reference RCW 39.30.060 RCW*)

Proposed Subcontractors and items of work to be performed:

Subcontractor Name: _____

HVAC Work to be Performed: _____

_____

_____

_____

Subcontractor Name: _____

Plumbing Work to be Performed: _____

_____

_____

_____

Subcontractor Name: _____

Electrical Work to be Performed: _____

_____

_____

_____

Subcontractor Name: _____

Structural Steel Installation Work to be Performed: _____

_____

_____

_____

Subcontractor Name: _____

Rebar Installation Work to be Performed: _____

_____

_____

_____

- make additional pages if necessary -

Work to be performed by Prime Contractor:

Work to be Performed: _____

_____

_____

_____

_____

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

RETAINAGE INVESTMENT OPTION

CONTRACTOR:

PROJECT NAME:

DATE:

Pursuant to R.C.W. 60.28.010, as amended, you may choose how your retainage under this contract will be held and invested. Please complete and sign this form indicating your preference. If you fail to do so, the Owner will hold your retainage as described in "Current Expense" option 1 below.

____1. Current Expense: The Owner will retain your money in its Current Expense Fund Account until thirty days following final acceptance of the improvement or work as completed. You will not receive interest earned on this money.

____2. Interest Bearing Account: The Owner will deposit retainage checks in an interest-bearing account in a bank, mutual savings bank, or savings and loan association, not subject to withdrawal until after the final acceptance of the improvement or work as completed or until agreed to by both parties. Interest on the account will be paid to you. Any fees incurred shall be the responsibility of the contractor.

____3. Escrow/Investments: The Owner will place the retainage checks in escrow with a bank or trust company until thirty days following the final acceptance of the improvement or work as completed. When the moneys reserved are to be placed in escrow, the Owner will issue a check representing the sum of the moneys reserve payable to the bank or trust company and you jointly. This check will be converted into bonds and securities chosen by you and approved by the Owner and these bonds and securities will be held in escrow. Interest on these bonds and securities will be paid to you as interest accrues.

The Contractor in choosing option (3) agrees to assume full responsibility to pay all costs which may accrue from escrow services, brokerage charges or both, and further agrees to assume all risks in connection with the investment of the retained percentages in securities.

____4. Bond-in-Lieu: With the consent of the Owner, the contractor may submit a bond for all or any portion of the amount of funds retained by the Owner in a form and from an authorized surety insurer acceptable to the Owner. Such bond and any proceeds therefrom shall be made subject to all claims and liens and in the same manner and priority as set forth for retained percentages in this chapter. The Owner shall release the bonded portion of the retained funds to the contractor within thirty days of accepting the bond from the contractor. Whenever an Owner accepts a bond in lieu of retained funds from a contractor, the contractor shall accept like bonds from any

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

subcontractors or suppliers from which the contractor has retained funds. The contractor shall then release the funds retained from the subcontractor or supplier to the subcontractor or supplier within thirty days of accepting the bond from the subcontractor or supplier.

Retainage is normally released 30 days after Final Acceptance of the work, or following receipt of Labor and Industries/Department of Revenue clearance, whichever date is the later. Retainage on landscaping work may be retained longer, due to its seasonal nature. State law allows for limited early release in certain circumstances.

CONTRACTOR:

Signature: _____

Print or Type Name: _____

Title: _____

Date: _____

THIS FORM TO BE EXECUTED AFTER CONTRACT IS AWARDED

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

AGREEMENT FORM

THIS AGREEMENT is made and entered into this _____ day of _____, 20___ by and between the City of Kirkland, Washington, a municipal corporation of the State of Washington, hereinafter referred to as "City" and _____, hereinafter referred to as "Contractor" effective as of the date of the first signature on the agreement so long as all other parties' authorized signatories have also executed the Agreement.

In consideration of the mutual covenants and obligations contained herein, the City and Contractor agree as follows:

1. **Agreement.** The "Contract Documents" form the "Contract." The Contract Documents consist of this Agreement, any attached Exhibits, the Project Manual, including the General Conditions; Supplemental Conditions, if any, Special Provisions, if any, the Specifications, Contract Plans, and Amendments to the Specifications; and written modifications, amendments and Change Orders to the Contract issued after execution of this Agreement, the City's Contract Bid Documents for the Project, including but not limited to the Bid package, Instructions to Bidder, Addenda, Proposal Form, Contractor's Proposal and all documents submitted therewith in response to the City's Invitation to Bid, and any additional documents referenced as comprising the Contract and Contract Documents, which are hereby fully incorporated as part of the Contract as if set forth herein.

2. **Project.** Contractor shall fully complete all Work and furnish all labor, tools, materials, and equipment for the project entitled _____, Project No. _____, including all changes to the Work, timely and in strict accordance with the Contract Documents.

3. **Payments.** In consideration of full and faithful compliance with the terms and conditions of this agreement and the Contract Documents, the City shall pay Contractor, at the times and in the manner provided in the Contract Documents, the total sum of _____ Dollars ($_____), which sum is subject, however, to increase or decrease in such proportion as the quantities for unit price items set forth in the Bid Proposal Form are so changed as set forth in the Contract Documents or as modified by an approved Change Order or addendum as permitted by the Contract Documents. The payments to Contractor include the costs for all labor, tools, materials, equipment, and subcontracts for the Work.

4. **Contract Sum.** The Contract Sum shall be the bid amount plus anticipated Washington State Sales Tax, subject to addition and deductions as provided in the Contract Documents.

   The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

   _____

   See Section 01 22 00 of the Contract Documents for descriptions of Unit Prices. Sales tax is not included in the unit prices listed below.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Unit Price	Price Per Unit
Unit Price 1: Unsuitable Soil	$____/bank cubic yard
Unit Price 2: Contaminated Soils	$____/bank cubic yard
Unit Price 3: Rock Removal	$____/bank cubic yard
Unit Price 4: Controlled Density Fill (CDF)	$____/cubic yard

Lump Sum	Price
1. Additional Exterior Signage	$5,000
2. Additional Interior Signage	$2,500
3. Parking Lot Restriping (Goodwill Parking Lot)	$9,200
4. Moisture Barrier	$2,400

See Specification Section 01 21 00 of the Contract Documents for description of Allowances.

5. **Completion Date.** The Contract Time shall be measured from the Notice to Proceed date to the date of Substantial Completion, subject to adjustments of the Contract Time as provided in the Contract Documents. Time is of the essence in completion of the Work. Contractor shall achieve Substantial Completion of the Work by 365 consecutive calendar Days after receipt of the notice to proceed, which shall be sent via e-mail, subject to adjustments of this Contract Time as provided in the Contract Documents, and shall achieve Final Completion not later than forty-five (45) consecutive calendar Days thereafter. Contractor represents to the City that the Contract Time is adequate for full performance of the Work. Contractor shall also achieve any interim milestones and phasing requirements set forth in the Contract Documents. If the physical Work under this Agreement is not completed within the time specified, Contractor shall pay liquidated damages and all engineering inspection and supervisions costs to the City as specified in the Contract Documents.

5. **Liquidated damages**. The City will assess, and Contractor will be responsible for, liquidated damages in the amount of $1975.00 per Day for each Day beyond the Contract Time that Substantial Completion is not timely achieved and $535.00 per Day beyond the Contract Time that Final Completion is not timely achieved. Contractor and the City agree that any liquidated damages established by this Agreement are not penalties and are a reasonable estimation of actual damages to the City, as of this date of Agreement, based on the inherent uncertainty and difficulty in calculating and quantifying damages caused by delays in the construction of the Project. This provision is intended to be in lieu of Contractor's liability for delay damages sustained by Owner by reason of Contractor's delay in reaching Substantial Completion by the date set for Substantial Completion. This provision shall not relieve or release Contractor from liability occasioned by other breaches or defaults under this Contract, nor shall it limit Owner's rights to terminate the Contract for cause pursuant to the General Conditions or to pursue any other remedy under the Contract or otherwise. In addition, Owner may recover its actual damages (including direct architectural, administrative, and other related costs attributable to the Project) as a result of any delay by Contractor in reaching Final Completion within the time required in Paragraph 4 above.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. **Independent Contractor.** Contractor's employees, while engaged in the performance of any of Contractor's services under this Agreement, shall be considered employees of the Contractor and not employees, agents, representatives of the City and as a result, shall not be entitled to any coverage or benefits from the City. Contractor's relation to the City shall be at all times as an independent contractor. Any and all Workman's Compensation Act claims on behalf of Contractor employees, and any and all claims by third-party as a consequence of any negligent act or omission on the part of Contractor's employees, while engaged in services provided to be rendered under this Agreement, shall be solely Contractor's obligation and responsibility.

7. **Jurisdiction and Venue.** Any lawsuit or legal action brought by any party to enforce or interpret this Agreement or any of its terms or covenants shall be brought in King County Superior Court for the State of Washington.

8. **Contract is complete and integrated agreement**. The Contract represents the entire, complete, and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. No oral representations or other agreements have been made by the parties except as specifically established in the Contract.

9. **Severability.** A court of competent jurisdiction's determination that any provision or part of this Agreement is illegal or unenforceable shall not cancel or invalidate the remainder of this Agreement, which shall remain in full force and effect. In such event a provision is determined void or unenforceable, the parties agree to negotiate a replacement provision to enable that party to receive the benefit as nearly as possible as to what it would have received but for the determination that a provision was illegal or unenforceable.

10. **Disclaimer.** No liability of Contractor shall attach to the City by reason of entering into this Agreement, except as expressly provided in this Agreement.

In witness whereof, the City, as approved by the City Council, and Contractor have executed this agreement by their proper officers or duly authorized agents

Dated: _____ Dated: _____

City of Kirkland [Contractor Name] (Contractor)

By: _____ By: _____

Its: _____ Its: _____

Attention: If Contractor is a corporation, the name of the corporation should be listed in full and both the President and Secretary must sign the contract. OR, if one signature is permitted by corporation by-laws, a copy of the by-laws shall be furnished to the City and made part of the Contract Documents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

If the business is a partnership, the full name of each partner should be listed followed by d/b/a and the firm or trade name. Any one partner may sign the Contract.

If the business is a limited liability company, an authorized management member or manager must sign followed by his/her title.

(For corporations, LLC's and other legal entities)

STATE OF WASHINGTON)
) SS
COUNTY OF KING)

On this day before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____, to me known to be the _____ of _____, the legal entity that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said legal entity, for the uses and purposes therein set forth, and on oath stated that he/she was authorized to sign said instrument.

Given under my hand and official seal this _____ day of _____, 20___.

_____
Print Name: _____
NOTARY PUBLIC in and for the State of Washington, residing _____
Commission expires: _____

(For individuals and d/b/a's)

STATE OF WASHINGTON)
) SS
COUNTY OF KING)

On this day before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me known to be the individual(s) described herein and who executed the foregoing instrument, and acknowledged that he/she/they signed the same as his/her/their free and voluntary act and deed, for the uses and purposes therein mentioned.

Given under my hand and official seal this _____ day of _____, 20__.

_____
Print Name: _____
NOTARY PUBLIC in and for the State of Washington, residing _____
Commission expires: _____

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

BONDS AND CERTIFICATES

The bond and insurance requirements set forth on the following pages are required of the successful bidder.

1.01 GENERAL: In addition to the Bid Security, the City of Kirkland requires the Contractor to furnish the following bonds and insurance. The insurance coverage shall be maintained during the life of the Contract and for not less than one year thereafter.

1.02 EVIDENCE OF COMPLIANCE:

A. Performance Bond: Submitted at time of execution of the Contract and attached thereto.

B. Labor, Materials, and Taxes Bond: Submitted at time of execution of the Contract and attached thereto.

B. Insurance: A Certificate of Insurance shall be filed with "City of Kirkland." This Certificate shall be reflective of all Insurance Coverage required by the City's Contract Documents. Any Certificate filed with the City of Kirkland found to be incomplete or not according to Form, will be returned as not satisfactory. Rejected Certificates shall be corrected as necessary and resubmitted to the City of Kirkland.

Certificates of Insurance shall indicate the following to be Additional Named Insureds:

- City of Kirkland; It's officers, elected officials, employees, agents, and volunteers
- Consultants hired by the City of Kirkland to administer the construction
- The Architect/Engineer of Record

In addition to the foregoing, the Certificate of Insurance must include a Cancellation Notification of not less than forty-five (45) days. The Certificate should also contain the Contract Number and a "concise verbal definition" of the Contract to which the Certificate applies.

1.03 INSURANCE GENERALLY: The Contractor shall not commence work under this contract until he has obtained the insurance required hereunder and such insurance has been approved by the City of Kirkland. In like manner, the General Contractor shall not allow any subcontractor to commence work on any subcontract until the subcontractor has submitted to the General Contractor a Certificate of Insurance reflective of the coverage required by the City of Kirkland. The City of Kirkland's approval of insurance shall not relieve or decrease the Contractor's liability hereunder. Each policy shall contain an endorsement stating that the insurance company will not, prior to the completion of the Work or any expiration date shown on the policy and certificate, whichever occurs first, terminate the policy or change any coverage therein without first mailing, by registered mail, written notice of such action

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

at least thirty (30) days prior to the termination or change, to the City of Kirkland. Certificate shall be issued on an ACORD Form, or a form that meets with the City of Kirkland's approval. The Insuring Company shall have a Best Rating of A, or meet with the City of Kirkland's approval.

The "Cancellation" Block shall be altered to include the wording "Should any of the above described policies be canceled or materially reduced before expiration date thereof, the issuing company will mail 30 days written notice to the certificate holder named to the left."

1.04 CONTRACTOR'S LIABILITY INSURANCE: The insurance required by the City of Kirkland is as specified below and in the amounts indicated:

A. Worker's Compensation and Employer's Liability Insurance: All employees of the Contractor and subcontractors shall be insured under Washington State Industrial Insurance. Employees not subject to the State Act shall be insured under Employer's Liability with a $2,000,000.00 limit of liability. A separate Certificate of Insurance shall be furnished to the City of Kirkland if any of the Contractor' payroll is not reported to the Washington State Industrial Insurance. The contractor shall be responsible for confirming compliance of all subcontractors with the above requirements.

B. Comprehensive General Liability and Comprehensive Automobile Liability Insurance: The Contractor shall obtain and retain Bodily Injury and Property Damage Liability Insurance providing the following:

1. Additional Insured: City of Kirkland, and the Architect/Engineer of Record shall be named as additional insured for liability arising out of the work of this Contract as a result of the negligence, real or alleged, on the part of the contractor and his subcontractors.
2. Limits of Liability: The minimum acceptable General Liability Limit shall be $5,000,000 Aggregate/$2,000,000 Occurrence. Coverage shall include owners & Contractors Protective Liability and Employers Liability (Stop-Gap) Coverage. The minimum acceptable Automobile Liability Limit shall be $2,000,000. The Owner does not represent that the minimum required insurance coverage or limits are adequate to protect Contractor from all liabilities.
3. Coverage: Coverage shall be written on an "Occurrence" Basis, or meet the City of Kirkland's approval. Coverage shall be as is usual to the practice of the Insurance Industry; included but not limited to the following coverages:
    a. Premises and Operations including Explosion, Collapse and Underground Liability;
    b. Products and completed Operations;
    c. Owners and Contractors Protective Liability;
    d. Broad form Property Damage Liability;
    e. Blanket Contractual Liability;
    f. Personal Injury Liability, including coverage's A, B, and C;
    g. Employers "Stop-Gap" Liability;
    h. Automobile Liability for All Owned, Non-Owned, Hired Leased or Borrowed Vehicles. Automobile Coverage shall include "Any Auto" or "Scheduled Autos" and shall include Hired and Non-Owned Auto Liability;
    i. Un-insured and Under-insured Motorist Coverage should also be in effect.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Products and Completed Operations Insurance: The minimum acceptable Annual Aggregate for Products and Completed Operations Liability shall be $5,000,000. This coverage must be maintained for a period of not less than three years after the final acceptance of the work performed.
5. Professional Liability: The minimum acceptable coverage for Professional Liability shall be $1,000,000, if applicable.

1.05 PROPERTY INSURANCE: The Contractor shall purchase and maintain property insurance upon the entire Work at the site to 115 percent of the full value thereof. This insurance shall include the interests the City of Kirkland, the Contractor, and all subcontractors in the Work being performed. The coverage shall be written on a "Builder's Risk" basis. All materials which are to be made part of the construction project are to be so insured while being stored at or off the job site(s) and/or while being transported to and from the job site(s). Insurance against loss of tools, equipment, construction, or otherwise not to be incorporated into the Work is the responsibility of the Contractor and the cost of such insurance shall not be included in the cost of insurance required herein before.

A. Waiver: City of Kirkland and the Contractor waive all rights against (1) each other and the subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Owner for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Article or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the City of Kirkland, as trustee.

1.06 BONDS

A. Performance and Payment Bond: Furnish surety bond (Section 00 61 40) in an amount equal to 100 percent of the Contract Sum covering faithful performance of the work and payment of labor and materials. Furnish bonds issued by a bonding company licensed to transact business in the locality of the Work and approved by the Owner. The bond must state that it is provided pursuant to Ch. 39.08 RCW.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PERFORMANCE BOND

SURETY TO HAVE AN A.M. BEST RATING OF A:VII OR BETTER.

Bond No. _____

KNOW ALL PERSONS BY THESE PRESENTS, that _____ **(Contractor)**, as Principal, and _____, (insert name of surety), as Surety, a corporation duly organized under the laws of the State of _____, (insert Surety's state of incorporation), and authorized to do business as a surety in the State of Washington, are held and firmly bound unto the City of Kirkland (City) in the sum of _____ dollars **($_____)**, lawful money of the United States of America, plus the total amount of extra orders issued by the City to the Principal pursuant to the terms of the Contract referred to in the next succeeding paragraph hereof, for the payment whereof Principal and Surety bind ourselves, and our heirs, executors, administrators, representatives, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has been awarded, and is about to enter into, a written Contract with the City for **PROJECT NAME: FIRE STATION 24**, which is hereby made a part of this bond as if fully set forth herein;

NOW, THEREFORE, the condition of this bond is such that:

1. If the Principal shall completely and faithfully perform all of its obligations under the Contract, including any warranties required thereunder, and all modifications, amendments, additions, and alterations thereto, including modifications which increase the contract price or time for completion, with or without notice to the surety;
2. If the Principal shall indemnify and hold the City harmless from any and all losses, liability, damages, claims, judgments, liens, costs, and fees of any type that the City may be subject to because of the failure or default of the Principal (a) in performance of any of the terms, conditions, or obligations of the Contract, including all modifications, amendments, additions, and alterations thereto, and any warranties required thereunder, and/or (b) in the payment for labor, equipment, and materials by satisfying all claims and demands incurred under the Contract, and reimbursing and paying Owner all expenses that Owner may incur in making good any default by the Principal; and
3. If the Principal shall indemnify and hold the City harmless from all claims, liabilities, causes of action, damages and costs, including property damages and personal injuries, resulting from any defect appearing or developing in the material provided or workmanship performed under the Contract;

THEN THIS obligation shall be null and void; otherwise to remain in full force and effect. If the City shall declare Principal to be in default of the Contract, and shall so notify Surety, Surety shall, within a reasonable time which shall not exceed 14 days, except for good cause shown, notify the City in writing of the manner in which surety will satisfy its obligations under this Bond.

Nonpayment of the Bond premium will not invalidate this Bond nor shall the City be obligated for the payment thereof. The Surety hereby waives notice of any modification of the Contract or extension of time made by the City.

Signed this _____ day of _____, 20__.

Principal:	_____	Surety:	_____
By:	_____	By:	_____
Title:	_____	Title:	_____
Address:	_____	Address:	_____
City/Zip:	_____	City/Zip:	_____
Telephone:	( ) _____	Telephone:	( ) _____

Note: A power of attorney must be provided which appoints the Surety's true and lawful attorney-in-fact to make, execute, seal and deliver this performance bond.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

LABOR, MATERIAL, AND TAXES BOND (PAYMENT BOND)

Surety to have an A.M. Best rating of A:VII or better.

Bond No. _____

KNOW ALL PERSONS BY THESE PRESENTS, that, _____ **(Contractor)**, as Principal, and _____, (insert name of surety), as Surety, a corporation duly organized under the laws of the State of _____ (insert Surety's state of incorporation), and authorized to do business as a surety in the State of Washington, are held and firmly bound unto the City of Kirkland (City) for the use and benefit of claimants as hereinafter defined, in the sum of _____ **Dollars ($_____),** lawful money of the United States of America, plus the total amount of any extra orders issued by the City, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, representatives, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has been awarded, and is about to enter into, a Contract with City of Kirkland for **PROJECT NAME: FIRE STATION 24**, which contract is by this reference made a part hereof;

WHEREAS, the contract is a public works contract, subject to the provisions of RCW Titles 39 and 60;

NOW, THEREFORE, the conditions of this obligation are such that, if the Principal shall promptly make payment to all claimants as hereinafter defined, for (a) all labor and material used or reasonably required for use in the performance of the contract and (b) all taxes, increases, and penalties incurred on the above-referenced contract under Titles 50, 51, and 82 RCW which may be due, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject, however, to the following conditions: A claimant is defined as and includes (a) a person claiming to have supplied labor or materials for the prosecution of the work provided for in the contract, including any person having direct contractual relationship with the contractor furnishing the bond or direct contractual relationship with any subcontractor, or an assignee of such person, (b) the state with respect to taxes incurred on the above-referenced contract under Titles 50, 51, and 82 RCW which may be due and (c) any other person or entity as allowed or required by law.

1. The Principal and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full prior to Final Acceptance of the project, or materials were furnished by such claimant, has an action on this bond for such sum or sums as may be justly due claimant, and may have execution thereon. The City shall not be liable for the payment of any costs or expenses of any such suit or action.

(Form continues on next page)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. No suit or action shall be commenced hereunder by any claimant (except the state with respect to taxes, increases, and penalties incurred on the above-referenced contract under Titles 50, 51, and 82 RCW which may be due) unless the claimant has sent the written notice required under RCW Title 39 to the Principal and to the City's Purchasing Agent by registered or certified mail, or by hand delivery, no later than 30 days after Final Acceptance of the Project.

The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against the improvement, whether or not claim for the amount of such lien be presented under and against this bond.

The Surety hereby waives notice of any modification of the contract or extension of time made by the City.

Signed this _____ day of _____ , 20___

Principal: _____	Surety: _____
By: _____	By: _____
Title: _____	Title: _____
Address: _____	Address: _____
City/Zip: _____	City/Zip: _____
Telephone: ( ) _____	Telephone: ( ) _____

Note: A power of attorney must be provided which appoints the Surety's true and lawful attorney-in-fact to make, execute, seal and deliver this performance bond.

END OF LABOR, MATERIAL AND TAXES PAYMENT BOND FORM

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

GENERAL CONDITIONS

PART 1 – GENERAL TERMS

1.1 DEFINITIONS

A. "Application for Payment" means a written request submitted by Contractor to Owner for payment of Work completed in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Owner may require.

B. "Architect," "Engineer," or "A/E" means a person or entity lawfully entitled to practice architecture or engineering, representing Owner within the limits of its delegated authority.

C. "Award of Contract" refers to City of Kirkland Council's acceptance of the Contractor's Bid. Council Award, or Bid Rejection, will occur within 60 calendar days after Bid opening. If the lowest responsible Bidder and the City of Kirkland agree, this deadline may be extended. If they cannot agree on an extension by the sixty (60) calendar day deadline, the City of Kirkland reserves the right to Award the Contract to the next lowest responsible Bidder or reject all Bids. The City of Kirkland will notify the successful Bidder of the Contract Award in writing.

D. "Change Order" means a written instrument signed by Owner and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any, and (3) the extent of the adjustment in the Contract Time, if any.

E. "Claim" means Contractor's exclusive remedy for resolving disputes with Owner arising out of or relating to the Contract Documents or the breach thereof or requesting an adjustment in the Contract Sum or Contract Time. As used in the Contract Documents, the exclusive meaning of "equitable adjustment" is the ability of Contractor to follow the contractual dispute resolution process as set forth herein, including the requirement for submitting a timely Notice, substantiation, and Claim.

F. "Construction Change Directive" ("CCD") is a written order prepared by Owner that directs Work prior to total agreement on adjustment, if any, in the Contract Sum or Contract Time, or both.

G. The "Contract" is the agreement between Owner and Contractor and is formed by the Contract Documents. The Contract represents the entire and integrated agreement between Owner and Contractor and supersedes prior negotiations, representations or agreements, either written or oral.

H. "Contract Award Amount" is the sum of the Base Bid and any City accepted Alternates, including applicable sales tax at the current rate where the project resides.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. "Contract Documents" includes the Executed Agreement, General Conditions, modifications to the General Conditions, Supplementary and Special Conditions, Drawings and Specifications, the Project Manual, the Bonds and Insurance Certificate Requirements provided in the Bid Documents, and all addenda and modifications thereof.

J. "Contract Sum" is the total amount payable by Owner to Contractor for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the Work, including applicable sales tax at the current rate where the project resides.

K. "Contract Time" is the number of calendar days allotted in the Contract Documents from the Notice to Proceed for achieving Substantial Completion of the Work.

L. "Contractor" means the person or entity who has agreed with Owner to perform the Work in accordance with the Contract Documents.

M. "Day(s)" means calendar day(s) unless otherwise specified.

N. "Drawings" are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.

O. "Final Acceptance" means the written acceptance of the Work by Owner, as more fully set forth in Section 6.

P. "Final Completion" means that the Work is fully and finally complete in accordance with the Contract Documents and Contractor has submitted its final Application for Payment, as more fully set forth in Section 6.

Q. "Force Majeure" means those acts entitling Contractor to request an equitable adjustment in the Contract Time, as more fully set forth in Section 3.

R. "Notice" means a written notice which has been delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended or, if delivered or sent by registered or certified mail, to the last business address known to the party giving notice.

S. "Notice to Proceed" means a written Notice from Owner to Contractor that permits pre-construction and construction activities to commence upon specified terms and defines the date on which the Contract Time begins to run.

T. "Owner" means the City of Kirkland, a municipal corporation, which has the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents. Owner shall designate in writing a Representative who shall have authority to bind Owner with respect to all matters requiring Owner's approval or authorization. A/E does not have such authority.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

U. "Person" means a corporation, partnership, business association of any kind, trust, company, or individual.

V. "Prior Occupancy" means Owner's use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.

W. "Project Manual" means all Bid Documents, Contract Documents, General Conditions, Supplementary Conditions, if any, Specifications, Special Provisions, if any, and Addenda, if any.

X. "Progress Schedule" means a schedule of the Work, in a form satisfactory to Owner, as further set forth in Section 3.

Y. "Project" means the total construction of which the Work performed in accordance with the Contract Documents may be the whole or a part and which may include construction by Owner or by separate contractors.

Z. "Schedule of Values" means a written breakdown allocating the total Contract Sum to each principal category of Work, in such detail and format as requested by Owner.

AA. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services. Specifications are prepared in sections which conform generally with trade practices. These sections are for Owner and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

BB. "Subcontract" means a contract between Contractor and a Subcontractor for the purpose of obtaining supplies, materials, equipment, work or services of any kind for or in connection with the Work.

CC. "Subcontractor" means any Person of any tier, other than Contractor, who agrees to furnish or furnishes by contract with, or through Contractor, any supplies, materials, equipment, or services of any kind in connection with the Work.

DD. "Substantial Completion" means that stage in the progress of the Work (or portion of the Work designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so that Owner can fully occupy or utilize the Work (or portion designated by Owner) for its intended use, as more fully set forth in Section 6. There may be separate dates of Substantial Completion specified in the Contract Documents for various phases or portions of the Work.

EE. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

FF. "Work Site" means the space identified and circumscribed on construction documents. The work site is controlled by the Contractor and the Contractor is responsible for compliance to regulatory requirements within the circumscribed area. Changes to the work site shall be submitted by Contractor and approved by Owner.

1.2 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents shall be resolved by giving the documents precedence in the following order, with a revision to a Contract Document having precedence over the original document and a later document having precedence over an earlier document:

1. Executed Agreement, including any Change Orders.

2. Supplementary Conditions.

3. Special Conditions or Modifications to the General Conditions.

4. General Conditions

5. Specifications and Drawings. The Specifications and Drawings are complementary and shall have equal precedence. Thus, anything mentioned in the Specifications but not shown on the Drawings, or shown on the Drawings but not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. If there is any inconsistency between the Specifications and Drawings, Contractor will make an inquiry to Owner to determine how to proceed. Unless otherwise directed, Contractor will provide the better quality or greater quantity of any Work or materials, as reasonably interpreted by Owner, at no change in the Contract Sum or Contract Time. In case of conflict within the Specifications, provisions in Division 1 shall take precedence over provisions of any other Division. In case of conflict within the Drawings, large scale Drawings shall take precedence over small scale Drawings.

6. Signed and Completed Bid Form

7. Instructions to Bidders

8. Advertisement for Bids

1.3 EXECUTION AND INTENT

Contractor Representations: Contractor makes the following representations to Owner:

1. Contract Sum and Contract Time reasonable: The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;

2. Contractor familiar with Project: Execution of the Contract by Contractor is a representation that Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character,

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

quality and quantity of the Work, the labor, weather, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof; No allowance shall subsequently be made on behalf of Contractor on account of error or negligence on its part or its failure to acquaint itself with the conditions of the site;

3. Contractor financially capable: Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor's obligations required by the Contract Documents; and

4. Contractor can complete the Work: Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

PART 2 – INSURANCE AND BONDS

2.1 CONTRACTOR'S LIABILITY INSURANCE

General insurance requirements: Prior to commencement of the Work, Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Owner that such insurance has been procured, including but not limited to (1) Certificates of Insurance, on ACORD Form 27 and/or ACORD Form 25-S, or other forms that are similarly binding on insurers, (2) the actual costs (expressed as a percentage) of Contractor's liability insurance under Section 2.1A.1 below, (3) endorsements, including endorsements for additional insureds as listed in Section 2.1D below, (4) evidence of State Workers' Compensation coverage, and (5) a copy of any builder's risk policy required by the Contract Documents. All policies, endorsements and certificates must be signed copies and shall contain a provision that coverages afforded under the policies cannot be materially altered (i.e. the coverages reduced, the limits decreased or the additional insured removed) allowed to expire, or cancelled without first giving forty-five (45) days prior written Notice by certified mail to Owner. Contractor shall furnish to Owner copies of any subsequently issued endorsements amending, modifying, altering or restricting coverage limits. Review of Contractor's insurance by Owner shall not relieve or decrease the liability of Contractor. Companies writing the insurance to be obtained shall be licensed to do business under Chapter 48 RCW or comply with the Surplus Lines Law of the State of Washington, and shall be acceptable to Owner.

Contractor shall include in the Contract Sum the cost of all insurance and bond costs required for the Work. Insurance carriers providing insurance shall be acceptable to Owner, and its A. M. Best rating shall be indicated on the insurance certificates.

A. Term of insurance coverage: Contractor shall maintain the following insurance coverage during the Work and for three years after Final Acceptance, with the exception of Professional Liability insurance, when required, which shall be maintained for a minimum of three years. Contractor shall also maintain the following insurance coverage during the performance of any corrective Work required by Section 5.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. General Liability Insurance: Commercial General Liability (CGL) on an Occurrence Form, including personal injury, bodily injury and property damage liability on Contractor's operations, including Subcontractors; on Work Contractor may subcontract or sublet to others; and on the indemnity provisions of this Contract. Coverage shall include, but not be limited to:

   a. Personal injury

   b. Blanket contractual liability;

   c. Completed operations/products liability;

   d. Explosion, collapse, and underground, which applicable to the work being performed; and

   e. Employer's liability coverage.

   Contractor's policy shall be designated primary coverage for both defense and indemnity, and any Owner's policies excess and non-contributory.

2. Automobile Liability Insurance: Automobile liability on an Occurrence Form for owned, non-owned, and hired vehicles.

3. Professional Liability: Required if professional services (e.g., architect, engineering, surveying, legal or medical) are being provided to the Owner and if those professional services are excluded from the General Liability Insurance provided. Coverage may be on a Claims Made basis, if coverage is maintained at least 3-years beyond Final Acceptance.

B. Industrial Insurance compliance: Contractor shall comply with the Washington State Industrial Insurance Act and, if applicable, the Federal Longshoremen's and Harbor Workers' Act and the Jones Act.

C. Insurance to protect for the following: All insurance coverages shall protect against claims for damages for personal and bodily injury or death, as well as claims for property damage, which may arise from operations in connection with the Work whether such operations are by Contractor or any Subcontractor.

D. Owner as Additional Insured: All insurance coverages shall be endorsed to include Owner, its officers, and employees, and any required governmental agencies as additional named insureds for Work performed in accordance with the Contract Documents, and all insurance certificates and endorsements shall evidence such additional insureds.

E. Subcontractor Coverage: Contractor shall ensure and require that Subcontractors have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors. Subcontractors shall name Contractor and Owner, any required governmental agencies, and others designated in the Contract Documents as well as their officers and employees, as additional insureds and give at least 30 Days' Notice of cancellation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.2 COVERAGE LIMITS

Insurance amounts: The minimum coverage limits shall be as follows for applicable required insurance are specified in the Bonds and Insurance Certificates Section (Section 00 60 00) included with the Bid Documents. To the extent not set forth in the Bonds and Certificates Section or otherwise in the Contract Documents, they are as set forth below:

A. Limits of Liability shall not be less than $2,000,000 Combined Single Limit for Bodily Injury and Property Damage (other than Automobile Liability) Each Occurrence; Personal Injury and Advertising Liability Each Occurrence.

B. $5,000,000 Combined Single Limit Annual General Aggregate.

C. $5,000,000 Annual Aggregate for Products and Completed Operations Liability.

D. $2,000,000 Combined Single Limit for Automobile Bodily Injury and Property Damage Liability, Each Accident or Loss.

E. $1,000,000 for Professional Liability, if applicable.

F. Coverages and Minimums: The Owner does not represent that the minimum required insurance coverage or limits are adequate to protect Contractor from all liabilities.

2.3 INSURANCE COVERAGE CERTIFICATES

A. Certificate required: Prior to commencement of the Work, Contractor shall furnish to Owner a completed certificate of insurance coverage and additional insured endorsements.

B. List Project info: All insurance certificates shall name Owner's Project number and Project title.

C. Cancellation provisions: All insurance certificates shall specifically require 45 Days prior notice to Owner of cancellation or any material change, except 30 Days for surplus line insurance.

2.4 PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, including Washington state sales tax, shall be furnished for the Work, using the City of Kirkland Contract Bond Form provided. Prior to execution of a Change Order, that cumulatively with previous Change Orders, increases the Contract Award Amount by 15% or more, the Contractor shall provide either new payment and performance bonds for the revised Contract Sum, or riders to the existing payment and performance bonds increasing the amount of the bonds. The Contractor shall likewise provide additional bonds or riders when subsequent Change Orders increase the Contract Sum by 15% or more. No payment or performance bond is required if the Contract Sum is $35,000 or less and Contractor agrees that Owner may, in lieu of the bond, retain 50% of the Contract Sum for the period allowed by RCW 39.08.010.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.5 ALTERNATIVE SURETY

When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety to protect Owner and persons supplying labor or materials required by the Contract Documents if (A) Owner has a reasonable objection to the surety; or (B) Any surety fails to furnish reports on its financial condition if required by Owner.

2.6 BUILDER'S RISK

A. Contractor to Buy Builder's Risk Insurance: When the project involves substantial new building construction, as determined by the Owner, Contractor shall purchase and maintain Builder's Risk insurance in the amount of the Contract Sum, including all Change Orders, for the Work on a replacement cost basis until Substantial Completion. For projects not involving new building construction, an "Installation Floater" is an acceptable substitute for the Builder's Risk insurance. The insurance shall cover the interests of Owner, Contractor, and any Subcontractors, as their interests may appear.

B. Losses Covered: Builder's risk insurance shall be placed on an "all risk" basis or equivalent policy form and insure against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, flood, wind, temporary buildings, debris removal including demolition, and shall cover reasonable compensation for A/E's services and expenses required as a result of an insured loss.

C. Waiver of Subrogation Rights: Owner and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/E's subconsultants, separate contractors, if any, and any of their subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Owner as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. Contractor shall require a similar waiver from its Subcontractors of Subcontractors' subrogation rights against Contractor, Owner, A/E, A/E's subconsultants as part of their Subcontract. A waiver of subrogation shall be effective to a Person or entity even though that Person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the Person or entity had an insurable interest in the property damaged.

PART 3 – TIME AND SCHEDULE

3.1 PROGRESS AND COMPLETION

A. Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within the time period specified in the Contract Documents. If Contractor fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or Subcontractor(s), fails to meet the Progress Schedule, Contractor shall be in default and shall take such steps as may be

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

necessary to immediately improve its progress without change in the Contract Sum or Contract Time.

B. Progress Schedule: Promptly, but in no event later than fourteen (14) days after issuance of the Notice to Proceed, Contractor shall prepare and submit a preliminary network diagram in the form of a critical path method analysis ("Progress Schedule"). See Section 01 32 00 for specific requirements for the Contractor's Construction Schedule ("Progress Schedule"). The Progress Schedule shall be related to the entire Project and fully consistent with the Contract Documents. The Progress Schedule shall not exceed time limits specified by the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work, and shall show the sequence in which Contractor and the dates on which Contractor plans to start and finish major portions of the Work, including dates for submission of Submittals, which shall be coordinated with the Progress Schedule and identify dates for Owner review, and for acquiring materials and equipment. The Owner shall not be obligated to accept any Early Completion Schedule suggested by the Contractor. If the Contractor feels that the Work can be completed in less than the specified Contract Time, then the Surplus Time shall be considered Project Float. This Float shall be shown on the Project Schedule. It shall be available to accommodate changes in the work and unforeseen conditions. Neither the Contractor not the Owner have exclusive right to this Float Time. It belongs to the Project.

C. Monthly Updates: With each Application for payment submitted by Contractor other than the final Application for Payment, Contractor shall submit to the Owner a current Progress Schedule revised to indicate the portion of the Work executed during the time period covered by the Application for Payment, all progress slippages occurring during the previously covered time period, and the corrective actions taken for the slippage carryover into the time period covered by the Application for Payment, the anticipated delays or difficulties, and all other information required to adequately present the actual status of the progress of the Work as of the date of the Application for Payment as may be further required by the Owner.

D. Compliance with Progress Schedule: In the event the Contractor falls behind the Progress Schedule to such an extent that the Owner in good faith determines that the Contractor will be unable to achieve Substantial Completion by the date set forth in the Progress Schedule, as such date may be extended as provided in the Contract Documents, the Contractor shall within two (2) working days following the Owner's demand therefor, provide to the Owner, in writing, a detailed explanation of the measures the Contractor will take in order to recover from the delays so that the progress of the Work complies with the Progress Schedule. If, in the Owner's good faith business judgment, the Contractor's intended recovery measures will not cause the Contractor to recover from the delay (provided such delay arises from a cause which is the Contractor's or its Subcontractor's responsibility) so as to achieve Substantial Completion on schedule, the Owner may direct the Contractor to accelerate the progress of the Work, at the Contractor's sole cost, which acceleration costs shall not cause an adjustment to the Contract Sum.

E. Contractor to notify Owner of delays: Contractor shall perform the Work in accordance with the most recent Progress Schedule submitted to Owner. Contractor shall promptly notify Owner in writing of any actual or anticipated event, interference, or that is delaying

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

or could delay achievement of any milestone, performance of any critical path activity of the Work, or delay in the Substantial Completion date. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such Notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.2 DELAY

A. Force Majeure Events: Acts of Force Majeure include, but are not limited to: acts of God or the public enemy; acts or omissions of any government entity not the fault of Owner or Contractor; fire or other casualty for which Contractor is not responsible; quarantine or epidemic; industry-wide strike or defensive lockout; unusually severe weather conditions which could not have been reasonably anticipated; and unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Owner was available. "Unusually severe weather" shall mean weather conditions that are abnormal for the period of time for which Force Majeure is claimed, that could not reasonably have been anticipated or avoided, and that had an adverse effect on the Progress Schedule.

B. Contract Time adjustment for Force Majeure: Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it submits Notice and a Claim in strict compliance with the requirements of Section 8. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.

C. Contract Time or Contract Sum adjustment if Owner at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in Contract Sum, if the cost or time of Contractor's performance is changed due to the fault or negligence of Owner, provided the Contractor submits Notice and a Claim in strict compliance with the requirements of Section 8.

D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, Contractor may be entitled to an adjustment in the Contract Time only for that portion of the delay or failure of performance that was concurrently caused, provided it submits Notice and a Claim in strict compliance with the requirements of Section 8, but shall not be entitled to an adjustment in Contract Sum.

F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise. Contractor shall not recover damages, an equitable adjustment or an increase in the Contract Sum or Contract Time from Owner where Contractor could have reasonably avoided the delay by the exercise of due diligence.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Types of damages permitted: If Contractor and its Subcontractors are entitled to a change in the Contract Sum, the amount of the change shall be the actual costs incurred by the Contractor and Subcontractors directly related to the change calculated in accordance with Section 7 and provided Contractor has complied with Section 8. Failure of Contractor to comply with Section 8 shall result in waiver of Contractor's Claim. Contractor and its Subcontractors shall not be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of Work, concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages including cumulative impacts; or similar damages.

H. Contractor to notify Owner of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Owner.

I. Pass through notification provisions to Subcontractors: Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

3.3 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages:

1. Reason for Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.

2. Calculation of Liquidated Damages amount: The liquidated damage amounts set forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from periodic payments to the Contractor.

3. Contractor responsible even if Liquidated Damages assessed: Assessment of liquidated damages shall not release Contractor from any obligations or liabilities

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

pursuant to the Contract Documents. If Contractor substantially fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or Subcontractor(s), fails to achieve Substantial Completion within the Contract Time, Contractor shall be in default.

B. Actual Damages: If no liquidated damages are set forth in the Contract Documents, actual damages may be assessed for failure to achieve both Substantial Completion and Final Completion within the time provided. Actual damages will be calculated on the basis of direct, architectural, administrative, and any other related costs attributable to the Project from the date when Substantial and/or Final Completion should have been achieved, as applicable. Owner may offset these costs against any payment due Contractor.

PART 4 – SPECIFICATIONS AND CONTRACT DOCUMENT REVIEW

4.1 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW

A. Specifications and Drawings are basis of the Work: The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.

B. Parts of the Contract Documents are complementary: The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Owner. If, during the performance of the Work, Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to A/E in writing.

D. Contractor knowledge of discrepancy in documents – responsibility: Contractor shall do no Work without applicable Drawings, Specifications, and, where required, accepted shop drawings and other Submittals, unless instructed to do so in writing by Owner. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.

E. Contractor to perform Work implied by Contract Documents: Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Interpretation questions referred to A/E: Questions regarding interpretation of the requirements of the Contract Documents shall be referred to the A/E.

4.2 SUBMITTALS

A. Definition of Submittals: "Submittals" means documents and other information required to be submitted to A/E by Contractor pursuant to the Contract Documents, showing in detail: the proposed fabrication and assembly of structural elements; and the installation (i.e. form, fit, and attachment details) of materials and equipment. Submittals can include, but are not limited to, shop drawings, product data, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed, Contractor shall submit all samples at its own expense. Owner may duplicate, use, and disclose Submittals provided in accordance with the Contract Documents. Submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require Submittals.

B. Approval of Submittals by Contractor and A/E: Contractor shall coordinate all Submittals with the Progress Schedule, shall review them for accuracy, completeness, and compliance with the Contract Documents, and shall indicate its approval thereon as evidence of such coordination and review. Where required by law, Submittals shall be stamped by an appropriate professional licensed by the state of Washington. Submittals submitted to A/E without evidence of Contractor's approval shall be returned for resubmission. Contractor shall review, approve, and submit Submittals with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or separate contractors. Contractor's Submittal schedule shall allow a reasonable time for A/E review. A/E will review, approve, or take other appropriate action on the Submittals. Contractor shall perform no portion of the Work requiring submittal and review of Submittals until the respective submittal has been reviewed and the A/E has approved or taken other appropriate action. Owner and A/E shall respond to Submittal with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed Submittals. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.

C. Contractor not relieved of responsibility when Submittals approved: Approval, or other appropriate action with regard to Submittals, by Owner or A/E shall not relieve Contractor of responsibility for any errors or omissions in such Submittals, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Owner or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor's means or methods of construction. If Contractor fails to obtain approval before installation and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Variations between Submittals and Contract Documents: If Submittals vary from the requirements of the Contract Documents, Contractor shall in detail describe such variations in writing, separate from the Submittals, at the time it submits the Submittals containing such variations. If Owner approves any such variation, an appropriate Change Order will be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be approved by Owner in writing. Approval for substitutions shall not be sought and shall not be approved through the submission of Submittals.

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

A. The City/Owner not Contractor, owns Copyright of Drawings and Specifications: The Drawings, Specifications, and other documents prepared by A/E are instruments of A/E's contracted service to the City through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, and A/E shall be deemed the author of them and will, along with any rights of Owner, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor's set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.

B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner and A/E. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E appropriate to and for use in the execution of their Work.

C. License granted to Owner: Contractor and all Subcontractors grant a non-exclusive license to Owner, without additional cost or royalty, to use for its own purposes (including reproduction) all Submittals, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing Submittals, Contractor and all Subcontractors warrant that they have authority to grant to Owner a license to use the Submittals, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Owner pursuant to the indemnity provisions in Section 5 from any violations of copyright or other intellectual property rights arising out of Owner's use of the Submittals hereunder, or to secure for Owner, at Contractor's own cost, licenses in conformity with this Section.

PART 5 – PERFORMANCE

5.1 CONTRACTOR CONTROL AND SUPERVISION

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

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner. The Contractor shall be responsible to the Owner for acts and omissions of Contractor, Contractor's employees, Subcontractors, and their agents and employees, and other person or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

B. Competent superintendent required: Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Contractor, as soon as practicable after award of the Contract, shall furnish in writing to Owner the name and qualifications of its proposed superintendent. Within 14 days of receipt of the information, Owner may reply to Contractor in writing stating (1) whether Owner has reasonable objection to the proposed superintendent or (2) that Owner requires additional time to review. The superintendent must be satisfactory to Owner and shall not be changed without the prior written consent of Owner. Owner may require Contractor to remove the superintendent from the Work or Project site, if Owner reasonably deems the superintendent incompetent, careless, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition.

C. Contractor to employ competent and disciplined workforce: Contractor shall enforce strict discipline and good order among all of the Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor's employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons. Owner may, by written notice, request Contractor to remove from the Work or Project site any employee Owner reasonably deems incompetent, careless, or otherwise objectionable.

D. Contractor to keep Project documents on site: Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed Submittals, and permits and permit drawings.

E. Contractor to comply with ethical standards: Contractor shall ensure that its owner(s) and employees, and those of its Subcontractors, comply with the Ethics in Public Service Act RCW 42.52, which, among other things, prohibits state employees from having an economic interest in any public works contract that was made by, or supervised by, that employee. Contractor shall remove, at its sole cost and expense, any of its, or its Subcontractors' employees, if they are in violation of this act.

F. Daily Reports: Contractor shall provide a Daily Report to the Owner for each work day during the Contract Time. The Daily Report shall be completed on a form subject to the approval of the Owner and Architect. The Daily Report shall include any disputed, delayed, or disrupted Work as well as any changed or additional Work requested or identified. The Daily Report shall not serve as a substitute for, or relieve Contractor of its obligations to provide formal written notice to Contractor as required by the Contract Documents, including but not limited to Section 7 and Section 8.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

5.2 PERMITS, TAXES, PATENTS AND ROYALTIES

A. Permits: Owner will obtain and pay for the Land Use Permit, General Building Permit, Civil Construction Permit, and Signage permit. All other permits and fees required to execute the work shall be obtained and paid for by the Contractor. Prior to Final Acceptance, the approved, signed permits shall be delivered to the Owner.

B. Contractor to comply with all applicable laws: Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work. No person shall, on the grounds, of age, race, creed, color, sec, sexual oriental, religion, national origin, marital status, honorably discharged veteran or military status, or disability (physical, mental, or sensory) be denied the benefits of, or otherwise be subjected to discrimination under any project, program, or activity funded in whole or in part under this Agreement.

C. Taxes: Contractor shall pay sales, consumer, use, business and occupation, income and similar taxes for the Work that are legally enacted when the initial Contract Sum is agreed.

D. Patents and Royalties: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Owner harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it shall promptly notify Owner of such potential infringement.

5.3 PREVAILING WAGES

A. Contractor to pay Prevailing Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate.

B. Statement of Intent to Pay Prevailing Wages: Before payment is made by the Owner to the Contractor for any work performed by the Contractor and subcontractors whose work is included in the application for payment, the Contractor shall submit, or shall have previously submitted to the Owner for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the Department of Labor and Industries, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Affidavit of Wages Paid: Prior to release of retainage, the Contractor shall submit to the Owner an Affidavit of Wages Paid, certified by the Department of Labor and Industries, for the Contractor and each and every Subcontractor that performed work on the Project. Contractor's compliance with this paragraph and RCW 60.28 is a condition precedent to the release of retainage to Contractor.

D. Disputes: Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of the Department of Labor and Industries. The arbitration decision shall be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.

E. Statement with pay application; Post Statements of Intent at job site: Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the prefiled statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

F. Contractor to pay for Statements of Intent and Affidavits: In compliance with chapter 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.

G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any subcontractor shall submit a certified copy of payroll records if requested.

5.4 SAFETY AND CLEAN-UP

A. Contractor responsible for safety: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work. Contractor shall be solely and completely responsible for conditions of the Project site, including safety of all persons and property, during performance of the Work. Contractor shall maintain the Project site and perform the Work in a manner that meets statutory and common-law requirements for the provision of a safe place to work. This requirement shall apply continuously and not be limited to working hours. Any review by Owner or A/E of Contractor's performance shall not be construed to include a review of the adequacy of Contractor's safety measures in, on or near the site of the Work.

B. Contractor safety responsibilities: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.

D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area. At a minimum, Contractor shall inform persons working on the Project site of the requirements of chapter 296-62 WAC, General Occupational Health Standards, any operations in their work area where hazardous chemicals are present; and the location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC. Contractor shall also provide training for persons working on the Project site which includes Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area, the physical and health hazards of the chemicals in the work area; the measures such persons can take to protect themselves from these hazards, the details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

E. Hazardous, toxic or harmful substances and Notice: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as “hazardous substances”), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 Days on the Project site. Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

F. Public safety and traffic: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor’s responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

G. Contractor to act in an emergency: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. No duty of safety by Owner or A/E: Nothing provided in this Section shall relieve Contractor of sole and complete responsibility for safety at the Project site, for sole and complete responsibility for any violation of safety or property protection requirements or the correction thereof, or impose any duty upon Owner or A/E with regard to, or as constituting any express or implied assumption of control or responsibility over, any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public. Any Notice Owner or A/E gives to Contractor of a safety or property protection violation will not: (1) relieve Contractor of sole and complete responsibility for the violation and the correction thereof, or for sole liability for the consequences of said violation; (2) impose any obligation upon Owner or A/E to inspect or review Contractor's safety program or precautions or to enforce Contractor's compliance with the requirements of this Section; or (3) impose any continuing obligation upon Owner or A/E to provide such Notice to Contractor or any other persons or entity.

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

5.5 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

A. Limited storage areas: Contractor shall confine all operations, including storage of materials, to Owner-approved areas.

B. Temporary buildings and utilities at Contractor expense: Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Owner and without expense to Owner. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.

C. Roads and vehicle loads: Contractor shall use only established roadways or temporary roadways authorized by Owner. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation.

D. Ownership and reporting by Contractor of demolished materials: Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Owner with a copy of all manifests and receipts evidencing proper disposal when required by Owner or applicable law.

E. Contractor responsible for care of materials and equipment on-site: Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

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

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

5.6 UNFORESEEN PHYSICAL CONDITIONS

A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than 7 Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.

B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Section 7 and Section 8. Failure to provide notice as required by this Section, Section 7 and Section 8 shall result in waiver of Contractor's right to any adjustment in the Contract Time and Contract Sum.

5.7 MATERIAL, EQUIPMENT, TESTS, AND INSPECTION

A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of A/E and after submittal and approval of a substitute request, is equal to that named in the Specifications, unless otherwise specifically provided in the Contract Documents.

B. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to complete the Work or to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonably implied by, the Contract Documents. Contractor shall not damage or endanger any work

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

of Owner or separate contractors by cutting, excavating, or otherwise altering the Work and shall not cut or alter the work of any other contractor unless approved in advance by Owner. Contractor shall restore all areas requiring cutting, fitting and patching to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

C. Owner may reject defective Work and non-conforming materials: Should any of the Work and/or materials be found defective, or in any way not in accordance with the Contract Documents, this Work, in whatever stage of completion, may be rejected by Owner. However, neither this authority of Owner nor a decision made either to exercise or not to exercise such authority shall give rise to a duty or responsibility of Owner or its representatives to Contractor, Subcontractors, their agents or employees, or other persons or entities performing portions of the Work. Work or materials condemned by the Owner or Architect/Engineer as failing to conform to Contract Documents, including but not limited to the quality of such materials, shall, upon notice from Owner or Architect/Engineer, be immediately removed by Subcontractor. Failure of Owner to immediately condemn any Work or materials as installed shall not in any way waive Owner's right to object thereto at any subsequent time.

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

E. Owner may conduct tests and inspections: Owner may, at any reasonable time, conduct such inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Owner shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Owner, such Owner inspection and tests are for the sole benefit of Owner and do not: constitute or imply acceptance; relieve Contractor of responsibility for providing adequate quality control measures; relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment; relieve Contractor of its responsibility to comply with the requirements of the Contract Documents; or impair Owner's right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.

F. Inspections or inspectors do not modify Contract Documents: Neither observations by an inspector retained by Owner, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Contractor responsibilities on inspections: Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Owner. Owner may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. Owner shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.8 CORRECTION OF NONCONFORMING WORK

A. Work covered by Contractor without inspection: If a portion of the Work is covered contrary to the request of Owner or the requirements in the Contract Documents or a governmental authority having jurisdiction, it must, if required in writing by Owner, be uncovered for Owner's observation and be replaced at Contractor's expense and without change in the Contract Sum or Contract Time.

B. Payment provisions for uncovering covered Work: If, at any time prior to Final Completion, Owner desires to examine the Work, or any portion of it, which has been covered, Owner may request to see such Work and it shall be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and, if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes such a request as provided in Section 7. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.

C. Contractor to correct and pay for non-conforming Work: Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor shall bear all costs of correcting such nonconforming Work, including additional testing and inspections.

D. Contractor's compliance with correction and warranty provisions: If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or within one year after the date for commencement of any system warranties established, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written Notice from Owner to do so. Owner shall give such Notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor's duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or replacement. Obligations under this Section shall survive Final Acceptance and are in addition to other warranties provided by contract or law.

E. Contractor to remove non-conforming Work: Contractor shall remove from the Project site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Owner.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Owner may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

G. Contractor to pay for damaged Work during correction: Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

H. No Period of limitation on other requirements: Nothing contained in this Section shall be construed to establish a period of limitation with respect to other obligations which Contractor might have according to the Contract Documents. Establishment of the time period of one year as described in this Section relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced and damages for failure to comply with the Contract Documents may be sought.

I. Owner may accept non-conforming Work and charge Contractor: If Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, Owner may do so instead of requiring its removal and correction, in which case the Contract Sum may be reduced as appropriate and equitable.

5.9 SUBCONTRACTORS AND SUPPLIERS

A. Subcontractor Responsibility: The Contractor shall include the language of this paragraph in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this Section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this paragraph apply to all subcontractors regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;

2. Have a current Washington Unified Business Identifier (UBI) number;

3. If applicable, have: Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW; a Washington Employment Security Department number, as required in Title 50 RCW; a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW; An electrical contractor license, if required by Chapter 19.28 RCW; an elevator contractor license, if required by Chapter 70.87 RCW, not

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3), on a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of the Owner's first advertisement of the project, and meet all supplemental responsibility criteria set forth in the Contract Documents.

B. Provide names of Subcontractors and use qualified firms: Before submitting the first Application for Payment, Contractor shall furnish in writing to Owner the names, addresses, and telephone numbers of all Subcontractors, as well as suppliers providing materials in excess of $2,500. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom Owner has a reasonable objection, and shall obtain Owner's written consent before making any substitutions or additions.

C. Coordination of Subcontractors; Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

D. Automatic assignment of subcontracts: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Owner provided that (1) the assignment is effective only after termination by Owner for cause pursuant to Section 9 and only for those Subcontracts which Owner accepts by notifying the Subcontractor in writing; (2) after the assignment is effective, Owner will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract; and (3) the assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

E. Owner may award other contracts; Contractor to cooperate: Owner may undertake or award other contracts for additional work at or near the Project site. Owner shall help coordinate the activities of Owner's own forces and of each separate contractor engaged by Owner with the Work of Contractor, who shall reasonably cooperate and coordinate with the other contractors and with Owner's employees and shall carefully adapt scheduling and perform the Work in accordance with these Contract Documents to reasonably accommodate the other work.

5.10 WARRANTY

A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Contractor responsibilities: With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract Documents, Contractor shall:

1. Obtain warranties: Obtain, assign if requested, and furnish directly to Owner, all warranties that would be given in normal commercial practice or that are required by the Contract Documents, first executed by the applicable Subcontractor and those suppliers and manufacturers furnishing materials for the Work, and subsequently countersigned by Contractor, which shall extend to Owner all rights, claims, benefits and interests that Contractor may have under express or implied warranties or guarantees against the Subcontractor, supplier or manufacturer for defective or non-conforming Work;

2. Warranties for benefit of Owner: Require all warranties to be executed, in writing, for the benefit of Owner;

3. Enforcement of warranties: Enforce all warranties for the benefit of Owner, if directed by Owner; and

4. Contractor responsibility for Subcontractor warranties: Be responsible to enforce any Subcontractor's, manufacturer's, or supplier's warranties should they extend beyond the period specified in the Contract Documents.

C. Warranties beyond Final Acceptance: The obligations under this Section shall survive Final Acceptance.

5.11 INDEMNIFICATION

A. Contractor to indemnify Owner: To the fullest extent permitted by law, Contractor shall defend, indemnify, and hold Owner and A/E, their consultants, and agents and employees, directors, elected officials, officers, lenders, successors and assigns of any of them (collectively, the "Indemnified Parties"), harmless from and against all claims, demands, losses, damages, or costs, including but not limited to damages arising out of bodily injury or death to persons and damage to property, direct and indirect, or consequential (including but not limited to costs and attorneys' fees incurred on such claims or in proving the right to indemnification), arising out of, caused by or resulting from performance of the Work. Contractor's indemnity and defense obligations do not extend to liability resulting from: the sole negligence or willful misconduct of the Indemnified Parties. Contractor's duty to indemnify and defend Owner for liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the concurrent negligence of (a) the Indemnified Parties; and (b) Contractor or its agents, employees, and Subcontractors and suppliers of any tier, shall apply only to the extent of the negligence of Contractor, its agents, employees, and Subcontractors and suppliers of any tier. This indemnification obligation shall include, but is not limited to, all Claims against the Owner by an employee or former employee of the Contractor or any Subcontractor.

B. Obligations: The obligations of Contractor under this Section shall survive completion, acceptance, final payment and termination of the Contract and shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity that

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

would otherwise exist as to any party or person described in this Section. To the extent the wording of this Section would reduce or eliminate the insurance coverage of Owner or Contractor, this Section shall be considered modified to the extent that such insurance coverage is not affected. To the extent that any portion of this Section is stricken by a court or arbitrator for any reason, all remaining provisions shall retain their vitality and effect.

C. RCW Title 51: Employee action and RCW Title 51: In any action against Owner and any other entity indemnified in accordance with this section, by any employee of Contractor, its Subcontractors, Sub-subcontractors, agents, or anyone directly or indirectly employed by any of them, the indemnification obligation of this section shall not be limited by a limit on the amount or type of damages, compensation, or benefits payable by or for Contractor or any Subcontractor under RCW Title 51, the Industrial Insurance Act, or any other employee benefit acts. **In addition, Contractor waives immunity as to Owner and A/E only, in accordance with RCW Title 51.**

D. Defense Costs. Defense cost recovery shall include all fees (of attorneys and experts), in costs and expenses incurred in good faith. In addition, Owner shall be entitled to recover compensation for all of its expenses (including materials and labor) consumed in its defense.

PART 6 – PAYMENTS AND COMPLETION

6.1 CONTRACT SUM AND APPLICATION FOR PAYMENTS

A. Owner shall pay Contract Sum: Owner shall pay Contractor the Contract Sum for performance of the Work, in accordance with the Contract Documents.

B. Contractor to submit Schedule of Values: At least 7 Days prior to submitting its first Application for Payment, Contractor shall submit to Owner for approval a breakdown allocating the total Contract Sum to each principal category of work, in such detail as requested by Owner ("Schedule of Values"), but including a minimum of 30 line items. The approved Schedule of Values shall allocate appropriate amounts, not less than 5% of the total bid, to that portion of the Work between Substantial Completion and Final Completion to recognize not-yet-earned costs for demobilization, O&M manuals, and any other requirements for Project closeout and in advancing the Work from Substantial Completion to Final Completion. The approved Schedule of Values shall be used by Owner as a basis for reviewing progress payments. Payment for Work shall be made only for and in accordance with those items included in the Schedule of Values.

C. Monthly Application for Payment with substantiation: At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an itemized Application for Payment for Work completed in accordance with the Contract Documents and the approved Schedule of Values. Each application shall be supported by such substantiating data as Owner may require.

D. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.011, as their interests appeared in the last preceding

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Application for Payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.3 are true and correct, to the best of Contractor's knowledge, as of the date of the Application for Payment. Owner has the right to request written evidence from Contractor that Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by Owner to Contractor for subcontracted Work. Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Owner shall not have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

E. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Owner, the actual progress of the Work with the Progress Schedule. The submission of an Application for Payment constitutes a certification that the Work is current on the Progress Schedule.

F. Payment for material delivered to site or stored off-site: If authorized by Owner, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:

1. Suitable facility or location within 10 miles of the Project: The material will be placed in a facility or location that is within a 10-mile radius of the Project, structurally sound, secure (continuously under lock and key), dry, lighted and suitable for the materials to be stored or otherwise approved by Owner;

2. Insurance provided on materials in facility or location: Contractor furnishes Owner a certificate of insurance extending Contractor's insurance coverage for damage, fire, and theft to cover the full value of all materials stored, or in transit;

3. Owner right of access to facility or location: Owner shall at all times have the right of access to the Project site;

4. Contractor assumes total responsibility for stored materials: Contractor and its surety assume total responsibility for the stored materials; and

5. Contractor provides documentation and Notice when materials moved to site: Contractor furnishes to Owner certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Owner when materials are moved from storage to the Project site.

6.2 PROGRESS PAYMENTS

A. Owner to pay within 30 Days: Owner shall make progress payments, in such amounts as Owner determines are properly due, within 30 Days after receipt of a properly executed Application for Payment. Owner shall notify Contractor in accordance with chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Withholding retainage; Options for retainage: Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including, at Owner's request, consent of surety to release of the retainage. In accordance with chapter 60.28 RCW, Contractor may request that monies reserved be retained in a fund by Owner, deposited by Owner in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Owner may permit Contractor to provide an appropriate bond in lieu of the retained funds.

C. Title passes to Owner upon payment: Title to all Work and materials covered by a progress payment shall pass to Owner at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Owner to insist on full compliance by Contractor with the Contract Documents. A progress payment, or partial or entire use or occupancy of the Project by Owner, shall not constitute acceptance of Work.

6.3 PAYMENTS WITHHELD

A. Owner's right to withhold payment: Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Owner from loss or damage for reasons including but not limited to: (1) Work not in accordance with the Contract Documents; (2) Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum; (3) Work by Owner to correct defective Work or complete the Work in accordance with Section 5; (4) Claims (except where an insurer has unconditionally accepted coverage) filed or reasonable evidence indicating probable filing of such claims unless Contractor provides security acceptable to Owner; (5) The failure of Contractor to make payments to Subcontractors for labor, materials or equipment; (6) Damage to Owner or a separate contractor (except where an insurer has unconditionally accepted coverage); (7) Failure to submit affidavits pertaining to wages paid or certified payrolls as requested or otherwise required by statute; (8) Contractor's failure otherwise to perform in accordance with the Contract Documents; or (9) Contractor's negligent acts or omissions: Cost or liability that may occur to Owner as the result of Contractor's fault or negligent acts or omissions.

B. Owner to notify Contractor of withholding for unsatisfactory performance: In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Owner shall notify Contractor in accordance with chapter 39.76 RCW.

6.4 RETAINAGE, BOND CLAIM RIGHTS, AND LIENS

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

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Liens: Contractor shall promptly pay (and secure the discharge of any liens asserted by) all persons properly furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited to, any Subcontractors) to the extent that Owner has paid Contractor for this Work. Owner may, at its option, withhold payment, in whole or in part, to Contractor until lien and claim releases are furnished. Contractor may provide other security acceptable to Owner, such as a bond, in lieu of paying disputed liens or claims. Contractor shall defend, indemnify, and hold harmless Owner from any liens, including all expenses and attorneys' fees, except to the extent a lien has been recorded because of a failure of payment by Owner for the Work implicated in any such lien.

6.5 SUBSTANTIAL COMPLETION

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

B. Owner to determine if Work is complete: Upon receipt of Contractor's list, Owner will make an inspection to determine whether the Work or designated portion thereof has achieved Substantial Completion. If Owner's inspection discloses any item, whether or not included on Contractor's list, that is not sufficiently complete in accordance with the Contract Documents so that Owner can occupy or utilize the Work or designated portion thereof for its intended use, Contractor shall, before the occurrence of Substantial Completion, complete or correct the item upon notification by Owner, and Contractor shall then submit a request for another inspection by Owner to determine Substantial Completion. If Owner determines that the Work or designated portion has not achieved Substantial Completion, Contractor shall expeditiously complete the Work or designated portion, again request an inspection, and pay the costs associated with the re-inspection.

C. Contractor to complete punch list in timely manner: Contractor shall prepare, continue to monitor, and cause to be completed, all punch lists with respect to the activity of each Subcontractor and report weekly to Owner on outstanding punch list items.

6.6 PRIOR OCCUPANCY

A. Prior Occupancy defined; Restrictions: Owner may, when legally permissible to do so and upon written Notice to Contractor, take possession of or use any completed or

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

partially completed portion of the Work ("Prior Occupancy") at any time prior to Substantial Completion, and Contractor shall cooperate with such occupancy and use and the establishment of a punch list. Unless otherwise agreed in writing, Prior Occupancy shall not: be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Owner provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date of Substantial or Final Completion; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.

B. Damage; Duty to repair and warranties: Notwithstanding anything in the preceding paragraph, Owner shall be responsible for loss of or damage to the Work resulting from Prior Occupancy. Contractor's one year duty to repair any system warranties shall begin on building systems activated and used by Owner as agreed in writing by Owner and Contractor.

6.7 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

A. Final Completion defined: Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved shall be established by Owner in writing, but in no case shall it constitute Final Acceptance, which is a subsequent, separate, and distinct action.

B. Final Acceptance defined: Unless otherwise determined by Owner, Final Acceptance shall be achieved after Contractor has completed all the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Owner in writing. Pursuant to RCW 60.28, "Lien for Labor, Materials, Taxes on Public Works," completion of the Contract Work shall occur upon Final Acceptance. Neither Final Acceptance nor final payment shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Owner arising from Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Final payment waives Claim rights: Acceptance of final payment by Contractor or any Subcontractor shall constitute a waiver and release to Owner of all claims by Contractor or any such Subcontractor for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Section 8.

PART 7 – CHANGES

7.1 CHANGE IN THE WORK

A. Changes in the Work: Changes in the Work may be accomplished after execution of the Contract without invalidating the Contract. Changes in the Work are recognized and incorporated into the Contract solely by Change Order and are subject to the limitations stated in this Part 7 and elsewhere in the Contract Documents. A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone. Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

B. Change Order: A Change Order is a written instrument signed by the Owner, Contractor, and Architect that modifies or amends the Contract Documents by setting forth: (1) a change in the Work, (2) the amount of any adjustment in the Contract Sum, and (3) the extent of any adjustment in the Contract Time. The Change Order shall constitute full payment and final settlement of all claims for time and direct, indirect, and consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity, related to any Work either covered or affected by the Change Order, or related to the events giving rise to the Change Order.

C. Change Order Proposal from Contractor: If Contractor at any time believes that a change in the Work has occurred that involves a change in the Contract Sum and/or Contract Time, Contractor shall provide written Notice to Owner in accordance with Section 8. Contractor's failure strictly to follow the procedure set forth in the Contract Documents shall waive any right of Contractor to a change in the Contract Sum or Contract Time on account of any such change in the Work.

D. Owner-Initiated Changes: For an Owner-initiated change or directive, Owner may

1. Request a written Change Order Proposal (COP) from Contractor. Contractor shall submit a COP within 14 Days of the request from Owner, or within such other period as mutually agreed. Contractor's COP shall be full compensation for implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time, and including compensation for all delays in connection with such change in the Work and for any expense or inconvenience, disruption of schedule, or loss of efficiency or productivity occasioned by the change in the Work. Upon receipt of the COP, Owner may accept the proposal and incorporate it into Change Order, reject the proposal, request further documentation, or negotiate acceptable terms with Contractor.

2. Issue a Construction Change Directive (CCD). Pending execution of a Change Order, Owner may issue a CCD directing Contractor to proceed immediately with the Work. A CCD is a written order prepared by Owner that directs Contractor to perform Work prior to total agreement on an adjustment, if any, in the Contract Sum and/or Contract Time. Owner may direct Contractor through a CCD, at any time and without invalidating the Contract, to proceed with a change in the Work or to perform Work that Contractor contends to be a change in the Work, with or without the agreement of Contractor and prior to agreement of the basis for adjustment, if any, to the Contract. Owner's use of a CCD does not constitute agreement that the directive constitutes a change in the Work, the Contract Sum or the Contract Time. All Work done pursuant to an Owner-directed change in the Work shall be executed in accordance with the Contract Documents. Upon receipt of a CCD, Contractor shall promptly commence and proceed diligently with performance of the directed

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Work. Within 7 Days of its receipt of a CCD, Contractor shall notify Owner in writing either (a) of its acceptance of its terms, in which case the terms will become effective, and the CCD will be incorporated into a Change Order, or (b) of Contractor's rejection of the terms, in which case Contractor must submit a written Rejection within 14 Days after Contractor delivered written Notice to Owner as noted above. The written Rejection must fully explain the reasons for rejecting the CCD and include all necessary supporting documentation. Failure to submit written Notice within 7 Days of Contractor's receipt of a CCD or a written Rejection with 14 Days after delivery of written Notice shall constitute Contractor's acceptance of the terms of the CCD. Contractor's Rejection of a CCD shall not relieve Contractor of its obligation to comply promptly with the CCD.

E. Contractor fault or negligence alleged as basis for change in Contract Sum: No change in the Contract Sum shall be allowed to the extent Contractor's changed cost of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible; or to the extent Contractor is responsible for change concurrently caused by Contractor and Owner; or to the extent the change is caused by an act of Force Majeure as defined in this Agreement.

7.2 CHANGE IN THE CONTRACT SUM

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

B. Allowances: Any Allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by Allowances shall be supplied for such amounts and by such persons or entities as Owner may direct, but Contractor shall not be required to employ persons or entities to whom Contractor has made reasonable and timely objection. Owner shall select materials and equipment under an Allowance with reasonable promptness. Allowances shall cover the net cost to Contractor of materials and equipment delivered and/or installed at the site, as identified in the Allowance, and all required taxes, less applicable trade discounts. Whenever actual costs are more than or less than Allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual, reasonable costs and the Allowances.

C. Methods for Calculating Change Order Pricing: The value of any Work covered by a Change Order or any adjustment to the Contract Sum shall be determined by fixed price, unless otherwise agreed to by Owner. The following procedures shall apply with respect to pricing:

a. Breakdown and itemization of details on COP: Contractor's COP shall be accompanied by a complete itemization of the costs, including labor, material, subcontractor costs, and overhead and profit. The costs shall be itemized in the manner set forth below, and shall be submitted on breakdown sheets in a form approved by Owner. If the total cost of the change in the Work does not exceed $2,000, Contractor shall not be required to submit a breakdown if the description of the change in the Work is sufficiently definitive for Owner to determine fair value.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Use of industry standards in calculating costs: All costs shall be calculated based upon appropriate industry standard methods of calculating labor, material quantities, and equipment costs such as R.S. Means or other standards acceptable to the Owner and Contractor.

c. Markups on additive and deductive Work: The cost of any additive or deductive changes in the Work shall be calculated as set forth below. Where a change in the Work involves additive and deductive work by the same Contractor or Subcontractor, small tools, overhead, profit, bond and insurance markups will apply to the net difference.

d. Components of Increased Costs: Any request for an adjustment of the Contract Sum shall include only the following

i. Craft labor costs: These are the labor costs determined by multiplying the estimated or actual additional number of craft hours needed to perform the change in the Work by the hourly labor costs. Craft hours should cover direct labor, as well as indirect labor due to trade inefficiencies. The hourly costs shall be based on the following:

1. Basic wages and benefits: Hourly rates and benefits as stated on the Department of Labor and Industries approved "statement of intent to pay prevailing wages" or a higher amount if approved by the Owner. Direct supervision shall be a reasonable percentage not to exceed 15% of the cost of direct labor. No supervision markup shall be allowed for a working supervisor's hours.
2. Federal insurance: Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation.
3. Travel allowance: Travel allowance and/or subsistence, if applicable, not exceeding those allowances established by regional labor union agreements, which are itemized and identified separately.
4. Safety: Cost incurred due to the Washington Industrial Safety and Health Act, which shall be a reasonable percentage not to exceed 2% of the sum of the amounts calculated in (1), (2), and (3) above.

ii. Material costs: This is an itemization of the quantity and cost of materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs, second from supplier quotations or if these are not available, from standard industry pricing guides. Material costs shall consider all available discounts. Freight costs, express charges, or special delivery charges, shall be itemized.

iii. Equipment costs: This is an itemization of the type of equipment and the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work. Costs will be

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

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

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

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

iv. Allowance for small tools, expendables & consumable supplies: Small tools consist of tools which cost $250 or less and are normally furnished by the performing contractor. The maximum rate for small tools shall not exceed the following:

1. 3% for Contractor: For Contractor, 3% of direct labor costs.
2. 5% for Subcontractors: For Subcontractors, 5% of direct labor costs.

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

v. Allowance for overhead and profit: This is defined as costs of any kind attributable to direct and indirect delay, acceleration, or impact, added to the total cost to Owner of any change in the Contract Sum. This allowance shall compensate Contractor for all non-craft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B&O taxes, office engineering, estimating costs, additional overhead because of extended time, profit, and any other cost incidental to the change in the Work. It shall be strictly limited in all cases to a reasonable amount, mutually acceptable, not to exceed the rates below:

1. Additive or Deductive Change Orders Performed by Contractor: 7 percent overhead and profit
2. Additive or Deductive Change Order for Work performed by Subcontractor(s): 5 percent overhead and profit for Contractor and 10 percent overhead and profit for Subcontractor(s).

vi. Insurance and bond premiums: Cost of change in insurance or bond premium, which shall be added after overhead and profit are calculated in accordance with paragraph (v) above: This is defined as:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Contractor's liability insurance: The cost of any changes in Contractor's liability insurance arising directly from execution of the Change Order; and
2. Payment and Performance Bond: The cost of the additional premium for Contractor's bond arising directly from the changed Work.

D. Deductive Change or Credit: The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7.3 CHANGE IN THE CONTRACT TIME

A. Changes in Contract Time: The Contract Time shall only be changed by a Change Order. Claims relating to time shall be made in accordance with Section 8.

B. Time extension permitted only if delay is not Contractor's fault: If Contractor is delayed at any time in the commencement or progress of the Work (1) by an act or neglect of Owner or anyone for whose acts Owner is responsible; or (2) by changes ordered by Owner in the Work; or (3) by Force Majeure; or (4) by delay authorized by Owner pending dispute resolution; or (5) by other causes that Owner determines may justify delay, then Contractor shall reasonably attempt to mitigate the delay, and the Contract Time shall be extended by Change Order for such reasonable time as Owner may reasonably determine consistent with the provisions of the Contract Documents. No adjustment in the Contract Time shall be allowed to the extent Contractor's changed time of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible.

C. Contractor must demonstrate impact on critical path of schedule: Any change in the Contract Time covered by a Change Order or Claim shall be limited to the change in the critical path of the Work attributable to the change or event(s) giving rise to the Change Order or Claim. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event had a specific impact on the critical path and, except in case of concurrent delay, was the sole cause of such impact, and could not have been avoided by resequencing of the Work or other reasonable alternatives.

D. Cost arising from change in Contract Time: Provided Contractor has strictly complied with the procedures set forth in Section 7 and Section 8, Contractor is entitled to compensation for the cost of a change in Contract Time only if all the following conditions are met:

1. Must be solely fault of Owner: The change in Contract Time must solely be caused by the fault or negligence of Owner or others for whom Owner is responsible;

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Demonstrate impact on critical path: Contractor must establish the extent of the change in Contract Time in accordance with Section 7.3C. Owner is not obligated directly or indirectly for damages or an increase in the Contract Sum for any delay suffered by a Subcontractor that does not increase the Contract Time; and

3. Limitations on Costs: Neither Contractor nor a Subcontractor of any tier is entitled to payment for costs arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of work; concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages, including cumulative impact; or similar damages.

PART 8 – CLAIMS AND DISPUTE RESOLUTION

8.1 CLAIMS

A. Definition: A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of the Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract Documents. The term "Claim" also includes other disputes and matters in question between Owner and Contractor arising out of or relating to the Contract Documents. Claims must be initiated in writing and be made in accordance with the Contract Documents.

B. Continuing Contract performance: Pending final resolution of a Claim, including the dispute resolution process, and except as otherwise agreed in writing or in the Contract Documents, Contractor shall proceed diligently with performance of the Work and maintain the Progress Schedule, and Owner shall continue to make payments of undisputed amounts in accordance with the Contract Documents.

C. Claims for additional cost: If Contractor wishes to make a Claim for an increase in the Contract Sum, written Notice as provided herein shall be given before proceeding to execute the Work, and written Notice and a written Claim must be made in accordance with this Part 8, or it will be waived.

D. Claims for additional time: If Contractor wishes to make a Claim for an increase in the Contract Time, written Notice as provided herein shall be given, and a written Claim must be made in accordance with this Part 8, or it will be waived.

E. Claims for consequential damages: Contractor and Owner waive certain Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes damages incurred by Owner for income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and damages incurred by Contractor for principal and home office overhead and expenses including but not limited to the compensation of personnel stationed there, for loss of financing, business and/or reputation, for losses on other projects, for loss of profit, and for interest or financing costs. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination. Nothing contained in this subparagraph, however, shall be deemed to

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

preclude an award of Owner's liquidated or other Owner delay damages, when applicable, in accordance with the Contract Documents, or to preclude or limit Contractor's obligation to indemnify Owner for damages, including direct, indirect or consequential damages, alleged by a third party.

8.2 CLAIMS PROCESS

A. Notice and Claims: Contractor shall provide Notice of any Claim within 14 Days of the event giving rise to the Claim. Contractor shall then provide its Claim, with substantiation as required in Paragraph B herein, no later than 20 Days after Contractor's submittal of its Notice of Claim. Any Notice and any Claim of Contractor, whether under the Contract or otherwise, must be made pursuant to and in strict accordance with the applicable provisions of the Contract Documents. No act, omission, or knowledge, actual or constructive, of Owner or anyone for whose acts Owner is responsible shall in any way be deemed to be a waiver of the requirement for timely written Notice and a timely written Claim unless Owner and Contractor sign an explicit, unequivocal written waiver. The fact that Owner and Contractor may consider, discuss, or negotiate a Claim that has or may have been procedurally or substantively defective or untimely under the Contract shall not constitute a waiver of the provisions of the Contract Documents unless Owner and Contractor sign an explicit, unequivocal written waiver. Contractor acknowledges and agrees that Contractor's failure to timely submit required Notices and/or timely submit Claims has a substantial impact upon and prejudices Owner, including but not limited to its inability to fully investigate or verify the Claim, mitigate damages, choose alternative options, adjust the budget, delete or modify the impacted Work, and/or monitor time, cost and quantities, and shall result in waiver of Contractor's Claim.

B. Claim must cover all costs and be documented: A Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor (and Subcontractors) may be entitled and may not contain reservations of rights without Owner's written approval; any such unapproved reservations of rights shall be without effect. At a minimum, a Claim shall contain the following information:

1. Factual statement of Claim: A detailed factual statement of the Claim for additional compensation and/or time, if any, providing all necessary dates, locations, and items of Work affected by the Claim and confirming the damages asserted (time and cost) are actually caused by and/or a result of the act, event, or condition complained of;

2. Dates: The date on which event(s) arose which gave rise to the Claim;

3. Individuals knowledgeable about Claim: The name of each individual, including but not limited to employees of Contractor, Subcontractors, Owner and/or A/E believed to be knowledgeable about the Claim;

4. Support from Contract Documents: The specific provisions of the Contract Documents that support the Claim;

5. Identification of other supporting information: The identification of any documents and the substance of any oral communications that support the Claim;

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. Copies of supporting documentation: Data and copies of any identified documents, other than the Contract Documents, that support the Claim;

7. Details on Claim for Contract Time: If an adjustment in the Contract Time is sought, the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted, and Contractor's analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time.

8. Details on Claim for adjustment of Contract Sum: If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories and with the detail required by Section 7; and

9. Statement certifying Claim: A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Owner is liable.

C. Waiver of rights: Any Claim of Contractor against Owner shall be conclusively deemed to have been waived by Contractor unless made in accordance with the requirements of Part 8.

D. Owner may investigate: To assist in the review of a Claim, Owner may at any time visit the Project site, communicate directly with Subcontractors, or request additional information (including requesting an audit as authorized below) in order to fully evaluate the issues raised by the Claim.

E. Owner may audit Claims: All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor or Subcontractors of any tier to permit Owner access to the books and records of Contractor or Subcontractors of any tier, or to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim, shall constitute a waiver of the Claim and shall bar any recovery. The audit may be performed by employees or representatives of Owner. Contractor and its Subcontractors shall provide adequate facilities acceptable to Owner for the audit during normal business hours. Contractor and all Subcontractors shall make a good faith effort to cooperate with Owner's auditors.

F. Reciprocal RCW 42.56 rights: Contractor agrees, on behalf of itself and Subcontractors, that any invocation of RCW 42.56 at any time by Contractor or a Subcontractor, or their respective representatives, shall initiate an equivalent right to disclosures from Contractor and Subcontractors for the benefit of Owner. Failure to fully comply with these requirements shall constitute a material breach of the Contract and shall constitute a waiver of all Claims by Contractor and any Subcontractor that does not fully comply.

8.3 FORMAL RESOLUTION OF CLAIMS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

A. Mediation Required: To the extent a Claim is not resolved by Owner and Contractor, Claims, disputes, or other matters in controversy arising out of or related to the Contract shall be subject to mediation as a condition precedent to the initiation of binding dispute resolution. This requirement cannot be waived except by an explicit written waiver signed by both Owner and Contractor. Unless Owner and Contractor mutually agree in writing otherwise, all unresolved Claims shall be considered at a single mediation session that shall occur after Substantial Completion and prior to Final Acceptance by Owner. A request for mediation shall be delivered in writing to the other party to the Contract, and the parties shall promptly attempt to mutually agree on a mediator. If the parties do not agree on a mediator within 30 Days of a party's demand, the mediation, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. Mediation shall proceed in advance of binding dispute resolution proceedings. The parties to the mediation shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction.

B. Litigation: Contractor may not commence litigation on a Claim unless the Claim has been raised and considered in accordance with the procedures of this Part 8, including mandatory mediation. Contractor shall have the burden to demonstrate in any litigation that it has complied with all requirements of this Part 8. All unresolved Claims of Contractor shall be waived and released unless Contractor has complied with the time limits of the Contract Documents, and litigation is served and filed within 180 Days after the Date of Substantial Completion approved in writing by Owner. This requirement cannot be waived except by an explicit, written waiver signed by Owner and Contractor. The pendency of a mediation, which shall mean the time period between a party's receipt of a written mediation demand and the date of the initial mediation session, shall stay this deadline for serving and filing a lawsuit. The deadline may also be stayed for an additional period by agreement of the parties or court order. Neither Contractor nor a Subcontractor, whether claiming under a bond or lien statute or otherwise, shall be entitled to attorneys' fees directly or indirectly from Owner (but may recover attorneys' fees from the bond or statutory retainage fund itself to the extent allowable under law).

PART 9 – TERMINATION OF THE WORK

9.1 TERMINATION BY OWNER FOR CAUSE

A. Notice to Terminate for Cause: Owner may, upon 7 Days written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:

1. Contractor repeatedly refuses or fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;

2. Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Contractor repeatedly refuses or fails in a material way to replace or correct Work not in conformance with the Contract Documents;

4. Contractor repeatedly refuses or fails to supply skilled workers or proper materials or equipment;

5. Contractor repeatedly refuses or fails to make prompt payment due to Subcontractors or for labor;

6. Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or

7. Contractor is otherwise in material breach of any provision of the Contract Documents.

B. Owner's actions upon termination: Upon termination, Owner may at its option:

1. Exclude the Contractor from the Site and/or take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;

2. Accept assignment of subcontracts pursuant to Section 5; and

3. Finish the Work by whatever other reasonable method it deems expedient.

C. Payment upon Termination: If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for A/E's services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of Contractor's actions, or any other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall survive termination of the Contract.

D. Contractor and Surety still responsible for Work performed: Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

E. Conversion of "Termination for Cause" to "Termination for Convenience": If Owner terminates Contractor for cause and it is later determined that none of the circumstances set forth in paragraph 9.01A exist, then such termination shall be deemed a termination for convenience pursuant to Section 9.

9.2 SUSPENSION OR TERMINATION BY OWNER FOR CONVENIENCE

A. Owner Notice of Suspension or Termination for Convenience: Owner may, upon written notice, suspend or terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Contractor Response to Termination Notice: Unless Owner directs otherwise, after receipt of a written notice of suspension or termination for either cause or convenience, Contractor shall promptly:

1. Stop performing Work on the date and as specified in the notice of suspension or termination;

2. Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not suspended or terminated;

3. For Work terminated, cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

4. For Work terminated, assign to Owner all of the right, title, and interest of Contractor in all orders and subcontracts to the extent that they relate to the performance of Work terminated;

5. Take such action as may be necessary or as directed by Owner to preserve and protect the Work, Project site, and any other property related to this Project in the possession of Contractor in which Owner has an interest; and

6. Continue performance only to the extent not terminated or suspended.

C. Terms of adjustment in Contract Sum if Contract terminated or suspended: If Owner terminates or suspends the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for an equitable adjustment for its reasonable direct costs incurred during the period of suspension or prior to the effective date of the termination, plus reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages, whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7. Failure of Contractor to comply with the requirements of Part 7 shall result in waiver of Contractor's claim.

D. Owner to determine whether to adjust Contract Time: If Owner terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Owner.

9.3 TERMINATION BY CONTRACTOR FOR CAUSE

A. Contractor termination: Except as provided by RCW 60.28.080, Contractor may terminate the Contract for any of the following reasons:

1. Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped permanently;

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. An act of government, such as a declaration of national emergency, that requires all Work to be stopped permanently; or

3. The Work is stopped for a period of 60 consecutive Days through no act or fault of Contractor, a Subcontractor, or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with Contractor.

B. Contractor termination procedure: If one of the above reasons exists, Contractor may, upon seven (7) Days' written Notice to Owner (during which period Owner has the opportunity to cure), terminate the Contract and recover from Owner payment for Work executed in accordance with the Contract Documents, including reasonable overhead and profit on Work executed and costs incurred by reason of such termination. The total recovery of Contractor shall not exceed the unpaid balance of the Contract Sum.

9.4 OWNER'S RIGHT TO STOP AND/OR CARRY OUT THE WORK FOR CAUSE

A. Owner may stop Work for Contractor's failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Owner may order Contractor, in writing, to stop the Work, or any portion thereof, until Owner has accepted satisfactory corrective action.

B. Owner may carry out the Work after Contractor's failure to perform: If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 14- Day period after receipt of written Notice from Owner to commence and continue to make reasonable progress toward the correction of such default or neglect with diligence and promptness, Owner may, without prejudice to other remedies Owner may have, correct such deficiencies, and an appropriate Change Order shall be issued deducting from payments then or thereafter due Contractor the reasonable cost of correcting the deficiencies, including Owner's expenses and compensation for A/E's additional services made necessary by the default, neglect or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the difference to Owner.

C. No equitable adjustment for Contractor's failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor's failure or refusal to perform or from any reasonable remedial action taken by Owner based upon such failure.

PART 10 – MISCELLANEOUS PROVISIONS

10.1 MISCELLANEOUS PROVISIONS

A. Applicable law and venue: The Contract Documents and the rights of the parties herein shall be governed by the laws of the state of Washington and the City of Kirkland, without regard to its choice-of-law provisions. Venue shall be in King County.

B. Bound to successors; Assignment of Contract: Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

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

C. Meaning of words used in Contract Documents: Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard Specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority, whether such reference is specific or by implication, shall be to the latest standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in the Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference shall apply to as many such items as are shown on the Drawings, or required to complete the installation.

D. No waiver of rights: Waiver of any provisions of the Contract Documents must be in writing and authorized by Owner. No other waiver is valid on behalf of Owner. No action, delay in acting, or failure to act by Owner or A/E shall constitute a waiver of a right or duty afforded under the Contract Documents, nor shall action, delay in acting, or failure to act constitute approval or an acquiescence in a breach therein, or otherwise prejudice the right of Owner to enforce a right or remedy at any subsequent time, except as may be specifically agreed in writing.

E. Rights under Contract do not limit other rights: Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

F. Severability: If any portion of this Contract is held to be void or unenforceable, the remainder of the Contract shall be enforceable without such portion.

G. Contractor must be registered and licensed: Pursuant to RCW 39.06, Contractor shall be registered and licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27. Contractor shall also have a current state unified business identifier number; have industrial insurance coverage for Contractor's employees working in Washington as required in Title 51 RCW; have an employment security department number as required in Title 50 RCW; have a state excise tax registration number as required in Title 82 RCW; and not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations).

H. Employer contributions: Pursuant to RCW 50.24, "Contributions by Employers," in general and RCW 50.24.130 in particular, Contractor shall pay contributions for wages

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

for personal services performed under this Contract or arrange for a bond acceptable to the Commissioner.

I. Apprenticeship requirements: If the Contract Sum for the Project exceeds one million dollars, Contractor shall comply with all applicable apprenticeship requirements, including but not limited to RCW 39.04.320. For each Project that has apprenticeship requirements, the Contractor shall submit a "Statement of Apprentice and Journeyman Participation" in a format approved by the City with every request for progress payment. The Contractor shall submit consolidated and cumulative data collected by the Contractor and collected from all subcontractors by the Contractor.

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

K. Six year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit, shall be retained for a period of not less than 6 years after the date of Final Acceptance. The Contractor agrees to provide access to and copies of any records related to this Agreement as required by the City to audit expenditures and charges and/or to comply with the Washington State Public Records Act.

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

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

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

O. Contractor is independent contractor: Contractor shall be and operate as an independent contractor in the performance of the Work and shall have complete control over and responsibility for all personnel performing the Work. Contractor is not authorized to enter

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

into any agreements or undertakings for or on behalf of Owner or to act as or be an agent or employee of Owner.

P. Owner's role is limited. Owner will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely Contractor's responsibility under the Contract Documents. The presence of Owner at the Project site shall not in any manner be construed as assurance that the Work is being completed in compliance with the Contract Documents, nor as evidence that any requirement of the Contract Documents of any kind, including Notice, has been met or waived. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Owner will not have control over or charge of and will not be responsible for acts or omissions of Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

SUPPLEMENTAL CONDITIONS

UNLESS EXPRESSLY OTHERWISE INDICATED, THE FOLLOWING REQUIREMENTS SUPPLEMENT THE REFERENCED ARTICLES OF THE "GENERAL CONDITIONS" SECTION 00 70 00 AND SUPERCEDE THEM WHERE THEY CONTRADICT THE SAME.

1.1 COVID-19 Health and Safety Plan (CHSP)

The Contractor shall prepare a project specific COVID-19 health and safety plan (CHSP). The CHSP shall be prepared and submitted prior to beginning physical Work. The CHSP shall be based on and in compliance with the most current State and Federal requirements and applicable guidelines. If the State or Federal requirements are revised, the CHSP shall be promptly updated as necessary to conform to the current requirements. Contractor is responsible for staying informed of applicable State and Federal updates regarding COVID-19 requirements.

The Contractor shall update and resubmit the CHSP as the work progresses and new activities appear on the Progress Schedules. If the conditions change on the project, or for a particular activity, the Contractor shall update and resubmit the CHSP. Work on any activity shall cease if conditions prevent full compliance with the CHSP.

The CHSP shall address the health and safety of all people associated with the project including Owner, workers in the field, Contractor personnel, consultants, project staff, subcontractors, suppliers and anyone on the project site, staging areas, or yards.

The CHSP shall address all applicable state and federal regulation requirements and at a minimum contain the following information before Work begins:

1. Identify Designated Representative (Title and/or Name) Responsible for Compliance
    a. Identify Designated Representative's responsibilities
    b. Identify procedure which the designated representative will implement to screen employees for potential COVID-19 exposure.
2. Employee Responsibilities: Company policy addressing employee hygiene, illness or COVID-19 exposure.
3. Social Distancing
4. Jobsite/Office Best Practices
    a. Project site cleaning protocol.
    b. Operation specific protocols as needed to comply with federal and state regulations and applicable guidelines.
5. Managing Sick Employees
    a. Process addressing employees that develop potential COVID-19 symptoms while at work (fever, cough, shortness of breath).
    b. Process for managing employees before returning to work.
    c. Process for response to employee notifying employer of positive test result for COVID-19.
6. Material Deliveries and Anyone Entering the Jobsite: Process to assure all outside vendors, suppliers and subcontractors comply with CHSP

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

7. Training, Education, and Communication: Process to inform and educate all employees of information contained in the CHSP.

COVID-19 Health and Safety Plan (CHSP) Inspection

The Contractor shall grant full and unrestricted access to the Owner for CHSP Inspections. The Owner (or designee) will conduct periodic compliance inspections on the project site, staging areas, or yards to verify that any ongoing work activity is following the CHSP plan.

If the Owner becomes aware of a noncompliance incident either through a site inspection or other means, the Contractor will be notified immediately. The Contractor shall immediately remedy the noncompliance incident or suspend all or part of the associated work activity. The Contractor shall satisfy the Owner that the noncompliance incident has been corrected before the suspension will end.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

CONTRACTOR'S AFFIDAVIT OF RELEASE OF CLAIMS AND LIENS

To OWNER: City of Kirkland
123 5th Avenue
Kirkland, WA 98033

Project Name: _____

Project Number: _____

From CONTRACTOR: [Contractor Name]
[Address]
[City, State, Zip Code]

CONDITIONAL RELEASE

The undersigned does hereby acknowledge and certify that upon receipt by the undersigned of a check from _____, in the sum of $_____ and when the check has been properly endorsed and has been paid by the bank upon which it was drawn, this document shall become effective to release any and all claims for compensation, impacts, additional time, costs, and rights of Claim or lien which the undersigned has on the above referenced Project for labor, services, equipment, materials furnished and/or claims through (Date:) _____ except it does not cover any retention or items furnished thereafter. Before any recipient of this document relies on it, said party should verify evidence of payment to the undersigned. Items and Claims not waived and released by this Instrument:

I CERTIFY UNDER PENALTY OF PERJURY UNDER LAWS OF THE STATE OF WASHINGTON THAT THE ABOVE IS A TRUE AND CORRECT STATEMENT.

Signature:
_____
(Authorized Corporate Officer/Partner/Owner)

Printed Name: _____

Title: _____

DATED:_____20___ at _____

_____
(City, State)

UNCONDITIONAL RELEASE

The undersigned does hereby acknowledge and certify that the undersigned has been paid and has received progress payments in the sum of $_____ for labor, services, equipment or materials furnished to the above referenced Project and does hereby release any and all claims for compensation, impacts, additional time, costs and rights of Claim or lien which the undersigned has on the above referenced Project, any state or federal statutory bond right and private bond right, any claim for payment. This release covers all payment for labor services, equipment, materials furnished and/or claims on the above referenced Project through (Date:) _____ only and does not cover any retention or items furnished after that date. Items and Claims not waived and released by this Instrument:

NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL RELEASE FORM.

I CERTIFY UNDER PENALTY OF PERJURY UNDER LAWS OF THE STATE OF WASHINGTON THAT THE ABOVE IS A TRUE AND CORRECT STATEMENT.

Signature:
_____
(Authorized Corporate Officer/Partner/Owner)

Printed Name: _____

Title: _____

DATED:_____ 20___ at _____

_____
(City, State)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

DEPARTMENT OF LABOR WAGE RATES

PART 1 - GENERAL

1.1 SUMMARY

A. Prevailing wage rates for the locality or localities of the Work, as described by the Industrial Statistician of the Department of Labor and Industries, are required for this contract. Contractor remains solely responsible for verifying that the rates are accurate, current, and inclusive for all parts of this Work. Any off-site prefabrication may also require prevailing wages and the Contractor should contact the Department of Labor and Industries to ascertain those rates.

B. Contractor to provide the "Notice of Intent to Pay Prevailing Wage Rates", as required by RCW 39.04, 39.12, 43.19, and 49.28 as amended. All paperwork regarding "Notice of Intent to Pay Prevailing Wage Rates" shall be sent directly to the Owner. The rules and regulations of the Department of Labor and Industries and the schedule of prevailing wage rates for the locality or localities where this Contract will be performed as determined by the Industrial Statistician of the Department of Labor and Industries, are by reference made a part of this Contract as though fully set forth herein.

Current prevailing wage rates for King County will apply to this project.
Current prevailing wage data are available online or at the following:

ADDRESS: Department of Labor and Industries
Prevailing Wage Section
P.O. Box 44540
Olympia, Washington 98504-4540

http://www.lni.wa.gov/TradesLicensing/PrevailingWage/RateDatabase/default.asp

The General Contractor and his sub-contractors are to pay for all filing fees for Statements of Intent to Pay Prevailing Wages and Affidavits . Pay for any change in rate during the course of construction.

Submit forms to: Department of Labor and Industries
Prevailing Wage Section
P.O. Box 44540
Olympia, Washington 98504-4540

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Type of the Contract.
3. Use of premises.
4. Specification formats and conventions.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: City of Kirkland Fire Station 24

1. Project Location: 9824 NE 132nd Street Kirkland, WA
   (Formerly 9820 NE 132nd Street Kirkland, WA)

B. Owner: City of Kirkland; Contact:

1. Anneke Davis, Senior Project Engineer. Phone (425) 587-3828

C. Architect: TCA Architecture and Planning, Seattle, Washington; Contact:

1. Project Architect: Forest Hooker. Phone 206/522-3830, Fax 206/522-2456.

D. Work of this contract includes but is not limited to the general construction, including mechanical and electrical and site work, for the development of a New Fire Station. Work includes, but is not limited to the following:

1. The Owner wishes to contract construction services for the City of Kirkland Fire Station 24 Project. The project includes a new Fire Station of approximately 11,975 sq. ft. and associated site and offsite work. The proposed station will be a steel framed structure with (3) apparatus bays, support spaces, crew work spaces, crew living spaces, and (8) sleeping rooms. The site is approximately 2.52 acres. Site work will include site structures, storm water systems, utilities, landscaping, paving, frontage improvements, traffic improvements (including signals) and offsite work as identified in the Contract Documents. The project has an additive bid alternate for a detention vault based storm system in lieu of a detention pond. Substantial Completion shall be achieved within three

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

hundred and sixty-five (365) calendar days after the Owner's Notice to Proceed and Final Completion shall be achieved within forty-five (45) calendar days after Substantial Completion. The A/E base bid estimate is $10,300,000 excluding sales tax. The A/E estimate for the Detention Vault Bid Alternate is $990,000 excluding sales tax.

1.4 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.5 USE OF PREMISES

A. Contractor's use of premises for Work and storage is limited to the area shown.

B. During the entire construction period the Contractor shall have the exclusive use of the designated portion of the premises for construction operations. The Contractor shall limit his use of the premises to the work indicated. Confine operations at the site to the areas permitted. Portions of the site beyond areas on which work is indicated are not to be disturbed.

C. Owner and Contractor shall jointly sign a written transmittal of all items to be deconstructed and preserved for re-use. Contractor to provide a schedule of items to be remove and re-used. Owner shall approve this list. Contractor to ensure protection from damage by mishandling, improper storage, contamination, inadequate protection, pilferage or other actions that could diminish material's or items' value.

D. Hours of Work: The contractor shall limit their work to those hours allowed by the building permit. Typically, the City of Kirkland allows construction only between the hours of 7 am and 8 pm, Monday through Friday, and between the hours of 9 am and 6 pm on Saturdays. Provide notification to the Owner for work on Saturdays. No construction on Sundays or observed holidays. Any other times of work shall be subject to approval of the Owner.

E. Security: The contractor shall maintain general security of the job site during construction.

F. Parking: The Owner shall not provide any off-site parking or staging for the Contractor.

G. Staging: The Owner shall not designate an off-site construction staging area. The Contractor shall prepare a staging plan to show locations of construction trailers and material storage within the project site.

H. Contractor shall install up to three City-provided informational signs at or near the two ends of the project's geographic limits. The informational signs will be chloroplast or aluminum signs up to 72 inches wide and 48 inches tall. The contractor will mount chloroplast signs to plywood sheets of the same size. This mounting can be skipped for aluminum signs. Contractor will install signs by setting two 4" x 4" x 10' posts (per sign) 36" below grade, set apart consistent with the width of the sign, and backfilling with soil at a location agreed upon by the City and the Contractor. Secure the sign so the top is 7' above ground level. Contractor will remove at substantial completion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. Miscellaneous: The Contractor shall:

1. Assume full responsibility for protection and safekeeping of products stored on premises

2. Patching existing paving on roads and adjacent properties damaged by the Contractor.

3. Keep roads and sidewalks and the work area clean of dirt and other debris.

1.6 EXISTING UTILITIES

A. The Architect assumes no responsibility for the completeness or accuracy of existing utility line information provided by the serving utilities and shown on the Drawings. Utility information shall be verified by the Contractor.

B. Unless otherwise required, maintain all existing water, gas, and irrigation lines, lighting, power, and telephone wires or conduits, plus any other surface or subsurface utilities, and their connections to structures, undisturbed during progress of work unless noted.

C. Should the Contractor, in the performance of the work, disturb, disconnect or damage any existing utilities required to remain in service, all expense arising from such disturbance, replacing or repair thereof shall be borne by the Contractor.

D. Maintain and operate utilities systems to assure continuous service, except as otherwise approved by the Owner and the Developer. Give not less than 14 days notice of proposed utility shutdowns.

E. Obtain approval from the Owner and all utility companies prior to cutting any utility lines.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 34-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.

2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

   a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances

C. Related Sections:

1. Division 00 Section "Bid Form" for Acknowledgement of Allowances in the Bid.

2. Divisions 02 through 33 Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM ALLOWANCES

A. Allowance shall include Direct Material Costs to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Contractor's Direct Labor Costs, Construction Equipment Usage Costs, Subcontractor Costs, and Fee for receiving and handling at Project site, which includes labor, installation, freight, overhead and profit, and similar costs related to products and materials selected by Architect under allowance shall be included as part of the of the allowance.

1. Allowance does not include Washington State Sales Tax (WSST).

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.

2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.

4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 14 days of receipt of Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 21 days after such authorization.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

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

3.3 SCHEUDULE OF ALLOWANCES – LUMP SUM

A. Allowance No. 1 (Base Bid): Lump-Sum Allowance: Include the sum of $5,000 for additional Exterior Signage on and around the building. NOT ALREADY SPECIFIED OR INCLUDED IN THE DRAWINGS.

B. Allowance No. 2 (Base Bid): Lump-Sum Allowance: Include the sum of $2,500 for additional Interior Signage at the building, including way-finding and accessible signage NOT ALREADY SPECIFIED OR INCLUDED IN THE DRAWINGS.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Allowance No. 3 (Base Bid): Lump-Sum Allowance: Include the sum of $9,2000 for parking lot restriping (approximately, 156 spaces) including directional signage at property east of the project site (Goodwill parking lot).

D. Allowance No. 4 (Base Bid): Lump-Sum Allowance: Include the sum of $2,400 for the addition of a Moisture Barrier, per section 03 30 00.

E. Additional incidental allowances referenced in other sections shall be included in the base bid.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Sections:
1. Division 00 Section "Bid Form" for bidder's statement of unit prices.
2. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders related to Unit Prices.
3. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 REFERENCES

A. WSDOT Most Current Washington State Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction.

B. Geotechnical Report, Fire Station 24 Replacement Kirkland, Washington, prepared for the City of Kirkland by HWA Geosciences, Inc. dated June 8, 2020.

1.4 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.5 PROCEDURES

A. Unit prices include all necessary material, plus cost for removal, disposal, delivery, installation, protection, measurement, documentation and other related work required for complete installation also to include costs for insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Methods of measurement and payment for unit prices are specified in the description of each unit price item.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No.1: Removal of Unsuitable Soils by over excavation **and** Replacement with Additional Imported Structural Fill material (see Section 31 00 00 – Earthwork, for structural fill standards and Soils report for fill recommendations).

1. Description: Unit price for Unsuitable Soils shall be measured as in-place in its original position, Bank cubic yards (BCY) of unsuitable soil being removed. The Contract unit price shall include all labor, materials, equipment, and fees necessary for excavating the unsuitable soil, loading, hauling and legal off-site disposal of the material at an approved site, measurement and documentation of the quantity of material removed and replaced and incidentals, import and placement of Structural Fill material to fill void, compaction, grading, protection from excess water, moisture conditioning, coordination, dewatering, and all work necessary to complete this particular work item.

2. All work to be paid at the unit price for removal of Unsuitable Soils must be pre-approved in writing by the Owner or their designated representative. Unsuitable Soils excavation performed without Owner or their designated representative's pre-approval, will be done at Contractor's expense.

3. The Contractor is required to coordinate daily, throughout the day with the Owner or their designated on-site representative, for verification of measurements and monitoring of the work. Owner representative will be available on-site throughout the earthwork process to assist in the measurement and monitoring of the work.

4. Soils deemed unsuitable as a result of the Contractor's failure to protect exposed subgrade, subbase and soil stockpiles from wet weather conditions and/or disturbance from construction activities will not be paid at the Unit Price for Unsuitable Soils and will be considered the responsibility of the Contractor.

5. Soils deemed unsuitable as a result of wet weather conditions due to construction delays by no fault of the Owner, will not be paid at the Unit Price for Unsuitable Soils and will be considered the financial responsibility of the Contractor.

6. Unit of Measurement: Bank Cubic Yard (BCY) of Unsuitable Soils excavated, based upon survey of volume in-place. Contractor is required to coordinate with Owners on-site representative to verify measurements.

B. Unit Price No.2 Contaminated Soils:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Unit Price No. 2: Removal of Contaminated Soils by over excavation **and** replacement with Additional Imported Structural Fill material (see Section 31 00 00 – Earthwork, for structural fill standards and Soils report for fill recommendations).

2. Unit Prices are for removal of contaminated soils as defined by the Ecology document "Guidance for Remediation of Petroleum Contaminated Sites", Publication No. 10-09-057 dated September 2011, Table 12.1. classifications for cPAH contaminated soil

3. Description: Unit Prices for Contaminated Soils shall be measured as in-place in its original position, Bank cubic yards (BCY) of Contaminated Soils being removed. The Contract unit prices shall include all labor, materials, equipment, and fees necessary for excavating the Contaminated Soils, loading, hauling and legal off-site disposal of the material at an approved site, measurement and documentation of the quantity of material removed and replaced and incidentals, import and placement of Structural Fill material to fill void, compaction, grading, protection from excess water, moisture conditioning, coordination, dewatering, and all work necessary to complete this particular work.

4. Health and safety requirements as well as certification and training required for removal of contaminated soils shall be included in the established unit prices.

5. All work to be paid at unit prices for removal of Contaminated Soils must be pre-approved in writing by the Owner or their designated representative. Contaminated Soils excavation performed without Owner or their designated representative's pre-approval, will be done at Contractor's expense.

6. The Contractor is required to coordinate with the Owner or their designated representative, for verification of measurements and monitoring of the work.

7. Unit of Measurement: Bank Cubic Yard (BCY) of Contaminated Soils excavated, based upon survey of volume in-place.

C. Unit Price No. 3: Rock Removal **and** Replacement with Additional Imported Structural Fill material (see Section 31 00 00 – Earthwork, for structural fill standards).

1. Description: Classified Rock removal/excavation, loading, hauling and legal off-site disposal of the material at an approved site, measurement and documentation of the quantity of material removed and replaced and incidentals, import and placement of Structural Fill material to fill void, compaction, grading, protection from excess water, moisture conditioning, coordination, dewatering, and all work necessary to complete this particular work item..

2. Definition – Classified Rock: Rock Removal/Excavation shall be defined as removal and legal off-site disposal of solid, ledge rock in place which, in the opinion of the Owner's Geotechnical Engineer, cannot be removed practically without the use of specialized pre-splitting methods such as: Drilling, wedging, prying, jacking, hydraulic hammering, etc. Soft, disintegrated rock that can be removed with a picking or scarifying action shall not be classified as rock excavation. Excavated boulders or rock fragments with a volume of ½- cubic yard or less shall not be classified as Rock Excavation.

3. All work to be paid at the unit price for "Rock Removal" must be pre-approved in writing by the Owner or their designated representative. Removal of Classified Rock performed without Owner or their designated representative's pre-approval, will be done at Contractor's expense.

4. The Contractor is required to coordinate with the Owner or their designated representative, for verification of measurements and monitoring of the work.

5. Unit of Measurement: Bank Cubic Yard (BCY) of Classified Rock excavated, based upon survey of volume removed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Unit Price No.4: Provision of Controlled Density Fill (CDF) in locations as authorized by the Owner or their designated representative:

1. Description: Provide CDF, per standard WSDOT Standard Specifications-2008, Section 2-09.3 (1) E requirements, at locations designated and authorized by the Owner or their designated representative.

2. All work to be paid at the unit price for Controlled Density Fill (CDF) must be pre-approved in writing by the Owner or their designated representative. Provision of CDF performed without Owner or their designated representative's pre-approval, will be done at Contractor's expense.

3. The Contractor is required to coordinate with the Owner or their designated representative, for verification of measurements and monitoring of the work.

4. Unit of Measurement: For the volume of mixture furnished and placed, the Contractor will be paid at the contract unit price per cubic yard of CDF volume as measured prior to placement. This payment shall be full compensation for placing the low strength mixture and for furnishing all materials, equipment and incidentals necessary to complete this item.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Bid Alternates (Bid Form Section 00 41 00).

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements and in Part 3 below that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Provide as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 - PRODUCTS (Not Used)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate # 1: Remove the detention pond as shown in the Drawings and Specifications and replace with the detention vault as shown in the Drawings and Specifications. Identified in Drawings and Specifications as Bid Alternate No. 1 or Bid Alternate Detention Vault.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. Related Sections include:

1. Division 01 Section "Allowances."

2. Division 01 Section "Unit Prices"

3. Division 01 Section "Product Requirements."

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 INITIAL REQUIREMENTS

A. Designate in writing the names of authorized members of Contractor's organizations who accept changes in the work and are responsible for informing other workers of the authorized changes.

B. At the beginning of the Project, the Contractor shall submit a breakdown of all applicable trade and class wage rates intended to be incorporated into this Project using form provided by the Owner.

C. Submit verification of the above rates if requested by the Owner.

1.4 DEFINITIONS

A. Change Order: See General Conditions, Section 00 70 00.

B. Architect's Supplemental Instructions: Work order, instructions, or interpretations, signed by Architect making minor changes in the work not involving a change in Contract Sum or Contract Time.

C. Construction Change Directive: See General Conditions, Section 00 70 00.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's standard form "Architect's Supplemental Instructions" or similar document as determined by the Owner.

1.6 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within 14 days after receipt of Proposal Request, submit Change Order Proposal with a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a Change Order Proposal, request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times,

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Change Order Proposal Form: Use Change Order Proposal form, approved by Architect.

1.7 CHANGE ORDERS

A. On Owner's approval of a Change Order Proposal, Architect will issue a Change Order for signatures of Owner and Contractor on Architect's standard form, or similar document as determined by the Owner.

B. Owner-approved Change Order Proposals may be grouped together for processing in a Change Order, as agreed upon by both Owner and Contractor.

C. Change Order Form: AIA Document G701or similar form.

D. All agreed-upon Change Orders shall be deemed full and final settlement of any and all claims of any kind, including without limitation those for direct or indirect costs or damages or for extension of time, relating to the subject matter of such Change Order.

E. Contractor shall not undertake any work or incur any expense that Contractor does not believe is included in the work required by the existing project contract documents, unless and until it brings such matter to Owner's attention and such work is authorized by a Construction Change Directive or agreed Change Order. Contractor shall be deemed to have waived any and all claims of any kind with respect to any work undertaken or expense incurred in violation of this provision

1.8 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on Architect's standard form, or similar document as determined by the Owner. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.9 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each lump sum proposal quotation and each unit price (not previously established) with sufficient substantiating data.

B. On request provide additional data to support time and cost computations:
   1. Labor required; hours, hourly rate.
   2. Equipment required.
   3. Products required.
      a. Recommended source of purchase and unit cost.
      b. Quantities required of each material.
      c. Material unit costs and extended price.
   4. Taxes, insurance, and bonds.
   5. Documented credit for work deleted from Contract.
   6. Overhead and profit. (See General Conditions.)
   7. Justification for any change in Contract Time.

C. Support each claim for additional costs, and time and material/force account work with documentation, as required for lump sum proposal. Include additional information:
   1. Name of Owner's authorized agent who ordered work, and date of order.
   2. Dates and times work was performed, and by whom.
   3. Time record, summary of hours worked, and hourly rates paid.
   4. Receipts and invoices for:
      a. Equipment used, listing dates and times of use.
      b. Products used, listing of quantities.
      c. Subcontracts.

D. Document requests for substitutions for Products as specified.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:
1. 00 72 00 General Conditions
2. Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances.
3. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
4. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with Continuation Sheets.
   b. Submittal Schedule.
2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven (7) days before the date scheduled for submittal of initial Application for Payment.
3. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
   a. Project name and location.
   b. Name of Architect.
   c. Contractor's name and address.
   d. Application number
   e. Date of application for payment.
2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Related Specification Section or Division.
b. Description of the Work.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that affect value.
g. Dollar value.
1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Identify bond cost as separate line item.
8. Identify overhead and profit as a separate line item. For each application through final completion, the amount of overhead and profit billed to date shall equal the percent of Work completed
9. The Architect may request additional items to be identified on the schedule of values.
10. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
11. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders(s) result in a change in the Contract Sum.
12. Report recycling costs. Refer to Section 01 7419, Construction Waste Management and Disposal.
13. The Contractor shall assign 5% of the total contract bid between Substantial Completion and Final Completion.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: At regular intervals but no more than once per month to be set in conjunction with the Architect and the Owner.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets, or similar if approved by the Owner, as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Include amounts of Change Orders issued before last day of construction period covered by application.

E. Provide updated recycling costs breakdown with each application for payment.

F. Transmittal: Submit four (4) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 48 hours. One copy shall include intent to pay prevailing wages and a running spreadsheet that itemizes both the intent and affidavit of wages paid to date for each subcontractor.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment (conditional and unconditional).
1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
   a. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.
5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede the first Application for Payment include the following:
1. List of subcontractors (required at pre-construction conference).
2. List of suppliers and fabricators
3. Schedule of Values. (at least 14 days prior to initial submittal)
4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants (required at pre-construction conference).
9. Copies of permits (required at pre-construction conference).
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work (required at pre-construction conference).
11. Report of pre-construction conference.
12. Certificates of insurance and insurance policies (required prior to contract award).
13. Performance and payment bonds (required prior to contract award).
14. Waste Management Plan

I. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
1. Completion of Project closeout requirements per section 01 77 00 Closeout Procedures".
2. Ensure that unsettled claims will be settled.
3. Ensure that incomplete Work not accepted, will be completed without undue delay.
4. Transmittal of required Project construction records to the Owner.
5. Proof that fees and similar obligations were paid.
6. Removal of temporary facilities and services.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

7. Removal of surplus materials, rubbish, and similar elements.

1.6 SPECIAL PAYMENT REQUIREMENTS

A. Payment for completed work will be made in accordance with the applicable sections of the contract documents.

B. Payment for completed work will include all costs relating to:
   1. Furnishing all materials and performing all work under the Contract (including changes in the work, materials, or plans) in a complete and acceptable manner.
   2. All risks, losses, damages, or expense, with the exception of negligence of the contractor, of whatever character arising out of the nature or prosecution of the work.
   3. All expenses incurred in consequence of the suspension or discontinuance of the work.

C. No payment will be made for:
   1. Work that was deleted from the Contract.
   2. Work which was not performed.
   3. Anticipated profit or overhead on work not performed or on work deleted from the Contract.
   4. Extended overhead costs resulting from any authorized extension of contract time.

D. No separate or special payment will be made for:
   1. Samples of materials or equipment submitted for testing by the Architect or by an authorized agent of the Architect.
   2. Tests carried out by the Contractor, any Subcontractor, supplier, or manufacturer unless specifically identified as an item for payment in the Bid Form or the project documents.
   3. The cost of any permits or fees unless specifically identified as an item for payment in the Bid Form or the project documents.
   4. Supervision by General Superintendents, Project Managers or General Foreman for force account work if required.

E. Adjustments: Adjustments in the amount to be paid by the Owner under the terms and conditions of the Contract will not be made as a result of any change in laws, ordinances or regulations except as specifically provided by the following:
   1. Changes in laws: The Owner will not adjust payment to compensate the Contractor for changes in legal requirements unless those changes are specifically within the scope of RCW 39.04.120, Pollution and Preservation of Natural Resources. For changes under RCW 39.04.120 the Owner will compensate the Contractor by negotiated Change Order or by force account.
   2. Changes in taxes: The Owner will adjust to compensate for tax changes under the following conditions.
      a. The changes involve Federal or State taxes on materials used in or consumed for the work.
      b. The changes increase Contractor paid taxes by more than $100.00.
      c. For items in the original contract, the tax change must occur after the bid opening date.
      d. The Contractor, if requested by the Architect, certifies in writing that the awarded contract price does not include an extra amount to cover a possible change in taxes.
      e. The Contractor permits the Owner to audit the Contractor's records to the extent necessary to substantiate and claim for compensation under the provisions of this section. Within the above conditions, the Owner will adjust compensation by the actual dollar amounts of increase caused by the tax changes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. The prices in the Bid Form will be full and just compensation for all direct and indirect costs associated with the provision of labor, materials, supplies, equipment, tools and all things of whatever nature are required for complete removal of the items from the work site, the same as though the items were to read "disposed of". The limits are generally as follows:

1. Item No 1 – Mobilization: Mobilization shall consist of pre-construction expenses and costs of preparatory work and operation performed by the Contractor which occurs before 10% of the awarded contract price is earned for work from other bid items.
    a. Items that are not to be included in the item of mobilization are:
        1) Any portion of the work covered by a specific bid item or incidental work that is to be included in a bid item or items.
        2) Profit, interest on bond money, overhead or management costs.
    b. Progress payments for "Mobilization" will be made in accordance with the following schedule:
        1) When 5% of the awarded contract price (excluding mobilization and amounts paid for material on hand) is earned, 50% of the amount bid for mobilization will be included in the progress estimate.
        2) When 10% of the awarded contract price (excluding mobilization and amounts paid for material on hand) is earned 100% of the amount bid for mobilization will be included in the progress estimate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Project meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 01 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Indicate relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Refer to Divisions 21, 22, 23 and 26 for specific Coordination Drawing requirements for mechanical and electrical installations.

B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities, list addresses and telephone numbers.

1.5 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site weekly, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda & Minutes prepared by the Architect, reviewed and approved by the Owner.
   a. As an option, the Owner may have their own project manager prepare the agenda and minutes.

B. Pre-construction Conference: The Architect will schedule a pre-construction conference before starting construction no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Tentative construction schedule.
b. Critical work sequencing.
c. Designation of responsible personnel.
d. Procedures for processing field decisions and Change Orders.
e. Procedures for processing Applications for Payment.
f. Distribution of the Contract Documents.
g. Submittal procedures.
h. Preparation of Record Documents.
i. Use of the premises.
j. Responsibility for temporary facilities and controls.
k. Parking availability.
l. Office, work, and storage areas.
m. Equipment deliveries and priorities.
n. First aid.
o. Security.
p. Progress cleaning.
q. Working hours.

3. Contractor shall arrange and conduct pre-construction conference as required by all authorities having jurisdiction.

C. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, contractor and active subcontractor, concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule:
1) Review progress since the last meeting and review 3-week look ahead schedule
a) Determine whether each activity is on time, ahead of schedule, or behind schedule
b) Determine how construction behind schedule will be expedited. Secure commitments from parties involved to do so
c) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Review present and future needs of each entity present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.
14) Documentation of information for payment requests.
15) Request for information.
16) Neighborhood issues.

3. Reporting: Architect shall distribute minutes of the meeting to each party present and to parties who should have been present.

4. Schedule Updating:
   a. The contractor shall update the Construction schedule after each progress meeting where revisions to the schedule have been made or recognized.
   b. The contractor shall update the 3-week look ahead schedule for each weekly meeting.
   c. The contractor shall issue a revised schedule at the next weekly meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Preliminary Construction Schedule.
   2. Contractor's Construction Schedule.
   3. Submittals Schedule.
   4. Daily construction reports.
   5. Field condition reports.

B. Related Sections include the following:
   1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
   2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
   3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
   4. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections
   5. Division 01 Section "Closeout Procedures" for coordinating Contract closeout and record documents.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
   2. Predecessor activity is an activity that must be completed before a given activity can be started.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

F. Milestone: A key or critical point in time for reference or measurement.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.4 SUBMITTALS

A. Submittals Schedule: Submit two copies of schedule. Arrange the following information in a tabular format:
   1. Scheduled date for first submittal.
   2. Specification Section number and title.
   3. Submittal category (action or informational).
   4. Name of subcontractor.
   5. Description of the Work covered.
   6. Scheduled date for Architect's final release or approval.

B. Preliminary Construction Schedule: Submit two printed copies and electronic file including a ".PDF" formatted file.

C. Contractor's Construction Schedule: Submit two printed copies of initial schedule large enough to show entire schedule for entire construction period. Submit additional electronic files in project scheduling program file format and include a ".PDF" formatted file.

D. Daily Construction Reports: Submit copies at weekly intervals.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting.

B. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
   1. Review software limitations and content and format for reports.
   2. Review delivery dates for Owner-furnished products.
   3. Review time required for review of submittals and re-submittals.
   4. Review requirements for tests and inspections by independent testing and inspecting agencies.
   5. Review time required for completion and startup procedures.
   6. Review and finalize list of construction activities to be included in schedule.
   7. Review submittal requirements and procedures.
   8. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication and delivery when establishing dates.
   1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
   2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for the “Notice to Proceed” to date of Final Completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 14 days, unless specifically allowed by Architect.
   2. Submittal Review Time: Include review and re-submittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
   1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
   2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, 25% Completion, 50% Completion, 75% Completion Substantial Completion and Final Completion.

F. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules. Acceptable software are:
   1. Microsoft; Projects
   2. Primavera Systems, Inc.; Sur Trak

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.
   1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established the Notice to Proceed.
   2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals.
      b. Purchase of materials.
      c. Delivery.
      d. Fabrication.
      e. Installation.
   2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
   3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

D. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
   1. Contractor or subcontractor and the Work or activity.
   2. Description of activity.
   3. Principal events of activity.
   4. Immediate preceding and succeeding activities.
   5. Early and late start dates.
   6. Early and late finish dates.
   7. Activity duration in workdays.
   8. Total float or slack time.

E. Schedule Updating:
   1. Schedule to be saved and issued as a tracking schedule. Baseline to be based on notice to proceed date.
   2. Contractor to submit electronically updated schedule in PDF to Architect and Owner's Project Manager at minimum once per month.
   3. Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
   4. Identification of activities that have changed.
   5. Changes in early and late start dates.
   6. Changes in early and late finish dates.
   7. Changes in activity durations in workdays.
   8. Changes in the critical path.
   9. Changes in total float or slack time.
   10. Changes in the Contract Time.

2.4 REPORTS

A. Daily Construction Reports: Submit form and format for review.
   1. Distribute daily construction reports to the Architect on a weekly basis.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Prepare a daily construction report recording the following information concerning events at Project site:
   - (i) List of subcontractors at Project site.
   - (i) List of separate contractors at Project site.
   - (ii) Approximate count of personnel at Project site.
   - (iii) High and low temperatures and general weather conditions.
   - (iv) Accidents.
   - (v) Meetings and significant decisions.
   - (vi) Unusual events (refer to special reports).
   - (vii) Stoppages, delays, shortages, and losses.
   - (viii) Emergency procedures.
   - (ix) Orders and requests of authorities having jurisdiction.
   - (x) Change Orders received and implemented.
   - (xi) Construction Change Directives received.
   - (xii) Services connected and disconnected.
   - (xiii) Equipment or system tests and startups.
   - (xiv) Partial Completions.
   - (xv) Completions authorized.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update baseline schedule to reflect actual construction progress and activities.

1. Save monthly updated schedule as PDF and send electronically to Architect and Owner's Project Manager.
2. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
3. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
4. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect**,** Owner, separate contractors, testing and inspecting agencies and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
1. Preconstruction photographs.
2. Periodic construction photographs.
3. Video Construction Monitoring
4. Final Completion construction photographs.

B. Related Sections include the following:
1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
2. Division 01 Section "Closeout Procedures" for submitting digital media as Project Record Documents at Project closeout.

1.3 SUBMITTALS

A. Contractor to provide Key Plan and photographs of work progress as described below:

1. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation of construction. Include same label information as corresponding set of photographs.

2. Construction Photographs: Submit weekly electronic file of each photographic view within seven days of taking photographs.

3. Format: Digital image ".JPEG" file format with date stamp sent electronically to architect and owner. Submit images that have same aspect ratio as the sensor, uncropped

4. Identification: Identify each file with the following naming:
(i) Name of Project. (NAME OF PROJECT)
(ii) Photo date (date taken MMDDYY).
(iii) Name of Contractor (Acronym).
(iv) Description of vantage point, (number from key plan, compass point and elevation).
(v) Description of work if not on key plan.

5. Final Submittal of Digital Images: Submit a complete set of digital image electronic files of construction on CD-ROM or other transmission method approved by Architect. Identify electronic media with project name and date of substantial completion.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in uncompressed "JPEG" or "TIFF" format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 pixels.

B. Photographic quality: Contractor to provide clear and recognizable photographs of a file size noted above to allow viewing of images both in printed form and digitally.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.2 VIDEO MONITORING SERVICES

A. Provide video monitoring surfaces with web-basef camera access for the Owner and A/E for the project duration (NTP until Substantial Completion). Contractor is responsible for all purchased components, rentals and monthly service fees.

1. Basis of Design System/Service Provider: TrueLook www.truelook.com
   a. (2) 12 Megapixel Cameras w/ digital zoom and 86 deg Field of View. Professional Outdoor Camera System.
      1) 4000x3000 pixel HD resolution
      2) Live video stream in H.264 format
      3) IP66/NEMA weather resistant enclosure
   b. Solar Power w/ 5 days battery backup power, or power from Contractor's temporary utility at the option of the Contractor.
   c. Web-based Interface Service: Cameras will be available via a web-based Software as a Service (SaaS) solution. The online interface will be managed and supported by the System Vendor. The Service will be available for the project duration and allow for viewing of live video and High Definition digital still images of the Project on both mobile and desktop platforms. Client logins shall never expire, granting access to captured data in perpetuity after service ends. Service includes the following features:
      1) Real-time live viewing
      2) Customizable time-lapse scheduling; time-lapses may be watched or downloaded at any time.
      3) Record 24/7 video on a 30-day loop and allow the Owner and A/E to view or download segments of this video footage from the web interface.
      4) Configurable Motion Alerts sent via email or text.
      5) Image Comparison Tool for comparing two images taken at different times overlaid on top of each other.
      6) Share Image and Markup tools.
      7) Camera user statistics.
      8) Live weather conditions and historical weather data.
      9) Secure HTTPS compliant with live stream secured and encrypted.
      10) Project Dashboard.
      11) Provide live images upon request to any number of simultaneous users; the system shall also provide live video upon request.
      12) An embeddable version of the interface shall be available for use on the Owner's web pages.
      13) Camera data shall be available for download directly within the web interface.
      14) Vendor shall provide 24/7 support at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

B. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in filename for each image.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Field Office Images: Maintain one set of images on CD-ROM in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect.

E. Preconstruction Photographs: Before commencement of Work or other site work, take digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Take at least eight photographs of existing conditions on or adjoining property to accurately record physical conditions at start of construction.

F. Periodic Construction Photographs: Take at least 12, digital photographs weekly, coinciding with the cutoff date associated with each Application for Payment. Vantage points indicated on Key plan to show status of construction and progress since last photographs were taken.

G. Take photos of unusual conditions or areas requiring additional information associated with Contractor's Request for Information, Architects Supplemental Information, Architect's Proposal Requests, and Change Orders.

H. Final Completion Construction Photographs: Take at least 12 digital photographs after date of Substantial Completion for submission as Project Record Documents.

3.2 VIDEO MONITORING

A. Video camera locations to be determined by the Owner.
1. Provide pipes/poles at Owner designated locations allowing for camera mounting at a maximum of 30' AFF. Provide all installation components for a complete system installation.
2. Allow for relocation of pipe/poles three times for each camera during the project durations at the direction of the Owner.
3. Contractor is responsible for securely installing pipes/poles and removing the systm at project completion.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections:
1. See Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule.
2. See Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
3. See Division 01 Section "Closeout Procedures" for submitting warranties; for submitting Record Drawings, Record Specifications, and Record Product Data; and for submitting operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Issue complete Submittals at the earliest possible date.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow 21 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be withheld for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 14 days for review of each resubmittal.

E. Identification: Place a permanent label or title block on each submittal for identification.
   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
   3. Include the following information on label for processing and recording action taken:
      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Submittal number or other unique identifier, including revision identifier.
         1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
      i. Number and title of appropriate Specification Section.
      j. Drawing number and detail references, as appropriate.
      k. Location(s) where product is to be installed, as appropriate.
      l. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
   1. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using its own transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
   1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked "Approved as noted."

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Use only final submittals with mark indicating "Reviewed as noted" or "Reviewed" taken by Architect.

1.5 CONTRACTOR'S USE OF ARCHITECT'S ELECTRONIC DRAWING FILES

A. General: At Contractor's written request, copies of Architect's electronic drawing files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:

1. Release of electronic drawing files will be restricted to the following categories:

a. Architectural floor plans.
b. Site plan.
c. Reflected ceiling plans.
d. Exterior elevations.
e. Requests for additional files will be considered by the Architect.

2. Request documents by submitting an executed copy of the Electronic Transfer Form, as provided by the Architect. Use of such documents implies Contractor's and subcontractors' agreement to the terms described on the form. Fully describe requirements for each request.

3. The Architect's Stamp will not be included with the transferred electronic files.

4. The Owner nor Architect shall make no warranties regarding the accuracy transferred electronic file data. The electronic files are not Contract Documents. Where discrepancies exist between the electronic files and the Contract Documents, the Contract Documents shall solely be relied upon.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:

a. Manufacturer's written recommendations.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Manufacturer's catalog cuts.
e. Wiring diagrams showing factory-installed wiring.
f. Printed performance curves.
g. Operational range diagrams.
h. Compliance with specified referenced standards.
i. Testing by recognized testing agency.

4. Number of Copies: Submit at least four copies of Product Data, unless otherwise indicated. Architect will return three copies, Contractor to retain one returned mark up copy as a Project Record Document to be included with final closeout documents.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data**,** unless submittal of Architect's CAD Drawings is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Notation of coordination requirements.
j. Notation of dimensions established by field measurement.
k. Relationship to adjoining construction clearly indicated.
l. Seal and signature of professional engineer if specified.
m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.

3. Number of Copies: Submit four opaque (bond) copies of each submittal. Architect will return three copies.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Submit samples for color selection concurrent with all other product submittals requiring color submittals for comparison and selection. Architect maintains the right to hold on to color sample submittals until all color submittals are received.

2. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

3. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of appropriate Specification Section.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.
   1. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.

F. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.
   1. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

   1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.

   2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Closeout Procedures."

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

R. Certificates: Written certification, signed by the manufacturer's representative, supplier or contractor. Indicate that the material or product conforms to or exceeds specific requirements including LEED criteria.

S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
   1. Statement on condition of substrates and their acceptability for installation of product.
   2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.
   1. Architect will not review submittals that include MSDSs and will return them for resubmittal.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Contractor's shall sign and stamp each submittal utilizing the following stamp language to certify review and compliance with the Contract Documents:

   a. "Contractor has reviewed and certified this submittal for compliance with the requirements of the Work and Contract Documents, including product verification, related Work and information coordination. Contractor shall field verify related dimensions prior to fabrication"

2. Deviations: Highlight, encircle or otherwise identify deviations from the Contract Documents on submittals.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. **Partial submittals are not acceptable**, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality-control services.

B. Quality control services include monitoring, inspections, tests and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services DO NOT relieve Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified inspections, tests and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.

3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

E. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 01 Section "Submittal Procedures" specifies requirements for development of a schedule of required tests and inspections.

1.3 RESPONSIBILITIES

A. Owner Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, the owner will employ and pay a qualified independent testing agency to perform inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are not included in the Contract Sum.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Owner Testing Laboratory inspection, sampling and testing is required, per International Building Code and/or Washington State Building and Energy Codes, in the following sections, and as noted on the Architectural, Structural and Civil Drawings:

   a. Division 03 - Concrete.
   b. Division 05 – Metals: Structural steel, and metal fabrications.
   c. Division 06 – Wood, Plastics, and Composites.
   d. Section 09 - Acoustical Panel Ceilings.
   e. Section 31 - Earthwork.
   f. Section 32 - Paving

2. Building Envelope Inspection and Testing Services (by RDH Building Science Inc. - Building Envelope Consultant):

   a. Examine all work related to the building envelope including roofs, walls, slabs, and foundations. Make interim inspections as work progresses. Monitor environmental/weather conditions, methods, and materials for conformance to Contract Documents and good exterior envelope construction practices whether or not specifically indicated by Contract Documents.
      1) Perform such tests and laboratory services as may be needed to verify conformance to Contract Documents and weather tightness.
      2) Cooperate with manufacturer representatives performing tests as indicated in respective specification sections.
   b. Promptly submit after each visit written report to Contractor, Owner, A/E and others as appropriate. Inform Contractor immediately by phone of any work in non-compliance.
   c. Perform additional inspections and tests requested by A/E or Owner, and when initial testing shows non-compliance with Contract Documents.

3. Rockery Monitoring Services (by HWA GeoSciences Inc.):

   a. Monitor existing rockery at the project site's north property line for movement resulting from construction activities.
   b. Monitoring to be performed during:
      1) Earthwork activities within 50' of the rockery base.
      2) Rammed Aggregate Piers installation.
      3) Other work as deemed necessary by the rockery monitoring agency.
   c. Notify Contractor, Owner and Architect immediately if unacceptable rockery movement occurs. Contractor shall suspend related activities upon notification and immediately notify the Owner.

4. Limitations of Inspection Agency: Agencies are not authorized to:

   a. Add, alter, revise or revoke requirements of Contract Documents.
   b. Approve or accept any portion of the work.
   c. Perform any duties of the Contractor.

B. Contractor Responsibilities: The contractor shall cooperate with agencies performing required inspections, tests and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

   1. Provide access to the Work.

   2. Conduct preconstruction meetings with each agency with the Owner and A/E present.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Conduct preinstallation meetings as required by specification sections. Agencies shall attend when work is related to the agency's services.

4. Furnish incidental labor and facilities necessary to facilitate inspections and tests.

5. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.

6. Provide facilities for storage and curing of test samples.

7. Deliver samples to testing laboratories.

8. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

9. Provide security and protection of samples and test equipment at the Project Site.

C. Material Safety Data: The Contractor is responsible for the provision of adequate written substantiation of the physical properties and proper handling of specified materials and products prior to use. Such written substantiation shall be maintained on site in an orderly manner. The cost of providing such substantiation shall be paid by the Contractor.

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

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities. Testing requirements shall be determined by the Architect in accordance with the International Building Code – 2015, and all Authorities Having Jurisdiction.

2. Contractor shall include a schedule of required inspections on the project schedule

3. Re-inspections shall be documented and will be billed back to the Contractor by change order

1.4 SUBMITTALS

A. The independent testing agency shall submit a certified written report, in duplicate, of each inspection, test or similar service to the Architect, Project Manager, Owner, Building Official, Contractor and Structural Engineer.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

2. Report Data: Written reports of each inspection, test or similar service include, but are not limited to, the following:

a. Date of issue.
b. Project title and number.
c. Name, address and telephone number of testing agency.
d. Dates and locations of samples and tests or inspections.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

e. Names of individuals making the inspection or test.
f. Designation of the Work and test method.
g. Identification of product and Specification Section.
h. Complete inspection or test data.
i. Test results and an interpretation of test results.
j. Ambient conditions at the time of sample taking and testing.
k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
l. Name and signature of laboratory inspector.
m. Recommendations on re-testing.

1.5 QUALITY ASSURANCE

A. Qualifications for Service Agencies: The Owner shall engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 01 Section "Cutting and Patching".

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

D. Repairs or corrective work due to a failing test is the responsibility of the Contractor at no additional cost to the owner.

E. Additional testing for failed tests is the responsibility of the Contractor at no additional cost to the Owner until all tests are completed successfully.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Comply with and give notices as required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the Work.

B. Regulatory requirements include modifications, amendments, additions, and the like, current as of the date of these documents.

C. Referenced codes establish minimum requirement levels. Where provisions of various codes or standards conflict, more stringent provisions govern. Promptly submit to Architect written notice of observed variations from legal requirements in Contract Documents.

D. Compliance requirements include, but are not necessarily limited to:

1. International Building Code (IBC) and related Standards, 2015 Edition, published by International Conference of Building Officials, and amended by the local Authorities Having Jurisdiction (AHJ).
    a. Washington state amendments (WAC 51-50)

2. Mechanical Work:
    a. International Mechanical Code (IMC), 2015 Edition and state amendments (WAC 51-52).
    b. Uniform Plumbing Code, 2015 Edition and state amendments (WAC 51-56).
        1) Uniform Plumbing Code Appendix A, B, and Appendix I, 2015 Edition state amendments (WAC 51-57)
    c. International Fuel & Gas Code (IFGC), 2015 Edition and state amendments (WAC 51-52).

3. Electrical Work:
    a. Underwriters' Laboratories (UL).
    b. National Electrical Manufacturers Association (NEMA).
    c. NFPA 70, 2017 National Electrical Code (NEC), National Electrical Safety Code, and above listings as applicable.
    d. State Electrical Construction Code (WAC 296-46B).

4. International Fire Code (IFC), 2015 Edition and state amendments (WAC 51-54).

5. Life Safety Code, NFPA 101-2015.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. Local County Ordinances and Codes

7. Energy Requirements: Washington State Energy Code (WSEC), 2015 Edition. Comply with insulation and energy conservation requirements of local State and City Authorities Having Jurisdiction.

   a. Washington state amendments (WAC 51-11)

8. National Fire Protection Association (NFPA) Codes.

9. ICC/ANSI 117.1-2009 (Accessible Standards + Chapter 10&11 of the 2015 IBC)

10. Americans with Disabilities Act of 1994.

11. Fire Doors/Windows, NFPA 80-2013.

12. Rules and Regulations for the Washington State Department of Health.

13. Department of Labor and Industries Regulations, (WAC 296) including General Safety and Health Standards, (WAC 296-24).

14. OSHA regulations and standards.

15. Washington Survey and Rating Board.

16. Environmental Requirements: Work to be performed in compliance with relevant statutes and regulations dealing with prevention of environmental pollution and preservation of public natural resources.

17. Washington State Department of Ecology. (DOE)

18. Applicable State Department of Transportation Codes and Specifications.

19. American Society for Testing and Materials (ASTM).

20. Factory Mutual (FM).

E. Drawings and Specifications govern whenever Drawings and Specifications require higher standards than are required by governing codes, regulations, and ordinances.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The)
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists (The)
ABAA	Air Barrier Association of America
ABMA	American Bearing Manufacturers Association
ACI	ACI International (American Concrete Institute)
ACPA	American Concrete Pipe Association
ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA)
AEIC	Association of Edison Illuminating Companies, Inc. (The)
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGC	Associated General Contractors of America (The)
AHA	American Hardboard Association (Now part of CPA)
AHAM	Association of Home Appliance Manufacturers
AI	Asphalt Institute
AIA	American Institute of Architects (The)
AISC	American Institute of Steel Construction

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)
ALSC	American Lumber Standard Committee, Incorporated
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
AOSA	Association of Official Seed Analysts, Inc.
APA	APA - The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute
ARI	Air-Conditioning & Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	ASME International
ASSE	American Society of Sanitary Engineering
ASTM	ASTM International (American Society for Testing and Materials International)
AWCI	AWCI International (Association of the Wall and Ceiling Industry International)
AWCMA	American Window Covering Manufacturers Association (Now WCSC)
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BIFMA	BIFMA International

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

	(Business and Institutional Furniture Manufacturer's Association International)
CCC	Carpet Cushion Council
CDA	Copper Development Association
CGA	Compressed Gas Association
CIMA	Cellulose Insulation Manufacturers Association
CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPA	Composite Panel Association
CPPA	Corrugated Polyethylene Pipe Association
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSA	CSA International (Formerly: IAS - International Approval Services)
CSI	Construction Specifications Institute (The)
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute)
DHI	Door and Hardware Institute
EIA	Electronic Industries Alliance
EJCDC	Engineers Joint Contract Documents Committee
EJMA	Expansion Joint Manufacturers Association, Inc.
FMG	FM Global (Formerly: FM - Factory Mutual System)
FMRC	Factory Mutual Research (Now FMG)
FSA	Fluid Sealing Association
GA	Gypsum Association
GANA	Glass Association of North America
HI	Hydraulic Institute
HI	Hydronics Institute
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

HPVA	Hardwood Plywood & Veneer Association
IAS	International Approval Services (Now CSA International)
ICEA	Insulated Cable Engineers Association, Inc.
ICRI	International Concrete Repair Institute, Inc.
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
IESNA	Illuminating Engineering Society of North America
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Alliance
ILI	Indiana Limestone Institute of America, Inc.
ISO	International Organization for Standardization
ISSFA	International Solid Surface Fabricators Association
ITS	Intertek
ITU	International Telecommunication Union
LEED	Leadership in Energy & Environmental Design
LMA	Laminating Materials Association (Now part of CPA)
LPI	Lightning Protection Institute
MFMA	Metal Framing Manufacturers Association
MH	Material Handling (Now MHIA)
MHIA	Material Handling Industry of America
MIA	Marble Institute of America
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NACE	NACE International (National Association of Corrosion Engineers International)
NADCA	National Air Duct Cleaners Association
NAIMA	North American Insulation Manufacturers Association

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

NBGQA	National Building Granite Quarries Association, Inc.
NCMA	National Concrete Masonry Association
NCTA	National Cable & Telecommunications Association
NEBB	National Environmental Balancing Bureau
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NLGA	National Lumber Grades Authority
NOFMA	The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association)
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	NSF International (National Sanitation Foundation International)
NSSGA	National Stone, Sand & Gravel Association
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)
PCI	Precast/Prestressed Concrete Institute
PDCA	Painting & Decorating Contractors of America
PDI	Plumbing & Drainage Institute
PGI	PVC Geomembrane Institute
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America)
PTI	Post-Tensioning Institute
RCSC	Research Council on Structural Connections
RFCI	Resilient Floor Covering Institute

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

SDI	Steel Deck Institute
SDI	Steel Door Institute
SGCC	Safety Glazing Certification Council
SIA	Security Industry Association
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SSINA	Specialty Steel Industry of North America
SSPC	The Society for Protective Coatings
STI	Steel Tank Institute
SWRI	Sealant, Waterproofing, & Restoration Institute
TCA	Tile Council of America, Inc.
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
TMS	The Masonry Society
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute)
UL	Underwriters Laboratories Inc.
UNI	Uni-Bell PVC Pipe Association
WAC	Washington Administrative Code
WASTEC	Waste Equipment Technology Association
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association (Now WCSC)
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association)
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association)
WHI	Warnock – Hersey (now ETL Semco or InterTek)
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California)
WIC	Woodwork Institute of California (Now WI)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

WMMPA	Wood Moulding & Millwork Producers Association
WSRCA	Western States Roofing Contractors Association
WWPA	Western Wood Products Association
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials (See ICC)
ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)
ICC	International Code Council
ICC-ES	ICC Evaluation Service, Inc.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. See Division 01 Section "Execution" for progress cleaning requirements.

C. See Divisions 02 through 33 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces**,** Architect, testing agencies, and authorities having jurisdiction.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1. Contractor to review site plan lay down areas, staging, access, use of site and other site related uses with Owner and Design Team at pre-construction meeting prior to start of work.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.

2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing and Entry/Access Gates: Minimum 2-inch, 9-gauge, galvanized steel, chain-link fabric fencing; minimum 6-feet high with galvanized steel pipe posts and rails and concrete bases for supporting posts.

B. Existing Temporary Fencing: Upon notice to proceed, the existing temporary site fencing and gates shall become the property of the Contractor. The contractor is responsible for maintaining, adding to and reconfiguring the existing temporary site fencing as required for performance of the Work.

C. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

D. Water: Potable.

2.2 TEMPORARY FACILITIES

A. General: Provide equipment suitable for use intended.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filters, in addition to air handling equipment filters, with MERV of 8 at each return air grille in system and remove at end of construction.

a. If HVAC system is used by Contractor the HVAC warranty shall start on the date the project is substantially complete and project has received either a certificate of occupancy or a temporary certificate of occupancy from the governing agency.

C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully-enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water, drinking-water units, including paper cup supply.

1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.

E. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110-to-120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

F. Power Distribution System Circuits: Where permitted, and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

C. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Enclose and dry building by use of heaters/fans/etc as required.

2. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.

D. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead, unless otherwise indicated.

2. Connect temporary service to Owner's existing power source, as directed by Owner.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

G. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.

1. Provide additional telephone lines for the following:

a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.

2. At each telephone, post a list of important telephone numbers including police and Fire Departments, Contractor's home office, Architects office, Owner's office, Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone for use when away from field office.

H. Electronic Communication Service: Provide temporary electronic communication service, including electronic e-mail and high speed internet service in field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.

2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earthwork."

3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Parking: Provide temporary parking areas for construction personnel.

E. Common-Use Field Office: Provide an insulated, weathertight, heated and air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project site. Keep office clean and orderly.

1. Furnish and equip offices as follows:
   a. Desk and four chairs, four-drawer file cabinet, a plan table, a plan rack, and bookcase.
   b. Provide a room of not less than 240 sq. ft. for Project meetings. Furnish room with conference table, 10 folding chairs, and 4-foot square tack board.
2. Provide an electric heater with thermostat capable of maintaining a uniform indoor temperature of 68 deg F.
3. Provide an air-conditioning unit capable of maintaining an indoor temperature of 72 deg F.
4. Provide fluorescent light fixtures capable of maintaining average illumination of 20 fc at desk height. Provide 110-to 120-V duplex outlets spaced a not more than 12-foot intervals, 1 per wall in each room.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Comply with the requirements of specification section 01 57 13 and NPDES Construction Storm Water General Permit.
2. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
3. Remove snow and ice as required to minimize accumulations.

G. Project Identification and Temporary Signs: Provide Project identification and other signs as required by the Authorities Having Jurisdiction, or the Contract Documents. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Such facilities shall be in accordance with the requirements of specification Section 01 74 19 and shall comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Stairs: Provide temporary stairs where ladders are not adequate.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, and specification Section 01 57 13.

C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Site Enclosure Fence: Before construction operations begin, inspect site enclosure fence to assure that it will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations and protection.

a. Refer to Section 01 56 39 “Temporary tree and plant protection” for additional requirements.

2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys**.**

E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

G. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking in construction areas.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for temporary site fencing.
2. Section 31 10 00 "Site Clearing" for removing existing trees and shrubs.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.

B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape or the average of the smallest and largest diameters at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.

C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 12 times the tree's caliper size and with a minimum radius of 96 inches and not under existing paving.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
b. Arborist's responsibilities.
c. Quality-control program.
d. Coordination of Work and equipment movement with the locations of protection zones.
e. Trenching by hand or with air spade within protection zones.
f. Field quality control.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13.
2. Product Data for Credit MR 4 Credit MR 5 For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.

a. Include statement indicating costs for each product having recycled content.

C. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
2. Detail fabrication and assembly of protection-zone fencing and signage.
3. Indicate extent of trenching by hand or with air spade within protection zones.

D. Samples: For each type of the following:

1. Organic Mulch: 1-quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
2. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

E. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For arborist and tree service firm.

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

E. Quality-control program.

1.8 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.

1. Planting Soil: Planting soil as specified in Section 32 91 13 "Soil Preparation"

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Ground or shredded bark
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 3-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.3 PROTECTION ZONES

A. Maintain protection zones free of weeds and trash.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 31 20 00 "Earth Moving" unless otherwise indicated.

B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
3. Cover exposed roots with burlap and water regularly.
4. Backfill as soon as possible according to requirements in Section 31 20 00 "Earth Moving."

B. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.

1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
    a. Type of Pruning: Cleaning, raising, reducing, and thinning where indicated.

B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.

C. Cut branches with sharp pruning instruments; do not break or chop.

D. Do not paint or apply sealants to wounds.

E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.

F. Chip removed branches and dispose of off-site.

3.7 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.

B. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 4-inch uniform thickness to remain.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work includes but is not limited to: Furnishing, installing and maintaining required temporary erosion and sediment control (TESC) measures for the duration of construction activities. Adjustments of TESC measures as necessary based on site conditions. Removal and disposal of TESC measures upon completion of construction.

1.2 RELATED SECTIONS

A. Coordinate and comply with the following sections:

1. 02 41 00 – Demolition

2. 31 00 00 – Earthwork

1.3 REFERENCE STANDARDS

A. The City of Kirkland (COK) pre-approved plans and policies, January 1, 2020 edition.

B. Washington Department of Transportation (WSDOT) Standard Specifications and Standard plans for Road, Bridge and Municipal Construction, 2020 edition.

C. King County Surface Water Design Manual KCSWDM, 2016 edition, and COK Policy D-10, Addendum to 2016 KCSWDM.

D. NPDES Stormwater Discharge Permit for Construction

E. The Standard Specifications apply only to the construction requirements and materials and how they are to be incorporated into the Work. If referenced standards conflict the more stringent specification shall apply. The legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

1.4 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 SUBMITTALS

A. See Division 1 Submittal Procedures

B. Construction Stormwater Pollution Prevention Plan (CSWPPP): Contractor shall review and update CSWPPP in accordance with KCSWDM and COK pre-approved plans and policies and submit to COK for review and approval. Contractor shall revise and resubmit to address comments from COK. CSWPPP shall identify Certified Erosion and Sediment Control Lead (CESCL) and backup per CESCL qualifications below.

A. The CESCL shall be responsible for implementing and maintaining effective ESC to prevent violations of the NPDES permits. Contractor shall submit current certification document of CESCL and CESCL backup and shall meet qualifications below :

1. The designated CESCL and CESCL backup shall have current certification and a minimum of two years in the State of Washington Department of Ecology's (WADOE) Training and Certification program for CESCL (http://www.ecy.wa.gov/programs/wq/stormwater/cescl.html).

2. CESCL shall have minimum thee projects of similar nature listed on resume identifying project name and location, year constructed, owner, contact name and phone number..

3. CESCL backup shall have minimum one project of similar nature listed on resume identifying project name and location, year constructed, owner, contact name and phone number.

B. Contractor shall prepare and submit a water quality monitoring plan for turbidity and pH sampling to monitor dewatering and construction stormwater discharges to the public storm system. Monitoring plan shall be in accordance with applicable state laws and requirements of COK and WADOE.

1.6 PERMITS

A. Obtain all permits, pay fees, and schedule inspections including but not limited to COK, WADOE for work in this Section.

1.7 QUALITY ASSURANCE

A. All treated water from the construction site and staging area shall be discharged to the storm drain system. No discharge shall be allowed to the sanitary sewer system.

B. Discharge shall be treated to meet the turbidity requirements of the WADOE and COK, whichever is more stringent.

C. Erosion control facilities shall be installed and maintained in conformance with the permit.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. No sediment shall be tracked into the street or onto paved surfaces. If sediment is tracked onto paved surfaces, the Contractor shall immediately perform street sweeping to remove sediment from the pavement.

1.8 COORDINATION

A. Contractor shall coordinate with Owner's Representative to transfer any WADOE construction stormwater general permit.

B. Coordinate erosion control installation and water quality monitoring with the requirements of COK and WADOE, as applicable.

PART 2 - PRODUCTS

2.1 SILT FENCE

A. Silt fence shall conform to COK pre-approved plan CK-E.03.

2.2 TEMPORARY PORTABLE SEDIMENT TANKS

A. Portable sediment tank with filtration treatment shall be Baker Tank or approved equal. Design and sizing of portable sediment tank, filtration and treatment systems shall be by a certified CESCL and shall be design to meet discharge turbidity requirements of COK and WADOE.

2.3 TEMPORARY PUMP AND PIPING

A. Contractor shall size and provide temporary pumps and piping, as necessary, to discharge construction stormwater from the project site

2.4 INLET PROTECTION

A. Inlet protection shall conform to COK pre-approved plan CK-E.11.

2.5 TEMPORARY CONSTRUCTION ENTRANCE

A. Temporary construction entrance shall conform to COK pre-approved plan CK-E.02.

2.6 INTERCEPTOR SWALES

A. Interceptor swales shall be per Drawings.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.7 ROCK CHECK DAMS

A. Rock check dams shall conform to COK pre-approved plan CK-E.07.

2.8 ADDITIONAL EROSION CONTROL MEASURES

A. Additional erosion control measures based on construction site conditions shall be provided in accordance with COK and/or WADOE requirements, whichever is more stringent.

PART 3 - EXECUTION

3.1 GENERAL

A. Contractor shall implement the CSWPPP procedures that are specific to this project for the duration of construction activities.

3.2 PERFORMANCE REQUIREMENTS

A. Contractor shall secure any required permits for discharge of dewatering and construction stormwater runoff and comply with associated permit conditions.

B. Contractor shall designate a CESCL and CESCL back-up to be responsible for implementing and maintaining TESC measures for the duration of construction activities.

C. Install temporary construction entrances, equipment wash areas, perimeter protection, and sediment tanks prior to onsite demolition and construction.

D. Clean and protect storm drain inlets so turbid water does not enter the drainage system.

E. Construct interceptor swales as needed during grading activities to direct sediment laden water to sump pumps for discharge to temporary sediment tanks.

F. Make provisions to prevent the transport of sediment onto adjacent paved roads. Provide street sweeping and sediment removal, as needed.

G. Prior to commencing demolition, grading, and other construction activities, contractor shall arrange inspection and obtain approval with COK inspector for ESC facilities after initial installation.

H. Operate and maintain erosion control facilities throughout the duration of construction. Provide flow and water quality monitoring results as required by permit agencies.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. Discharge from the construction site shall pass through the Temporary Sediment Tanks prior to discharge to the public storm drain system.

J. Temporary Sediment Tanks shall be supplemented with sand filters, as required, to meet discharge turbidity requirements.

K. Protect soil stockpiles with plastic sheeting secured to prevent the transport of sediment.

L. Discharge shall be detained on-site, if necessary, and not exceed COK and WADOE requirements.

M. At the completion of construction, remove erosion control facilities that are no longer required and clean site.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:

1. Division 01 Section "Allowances" for products selected under an alternate.
2. Division 01 Section "References" for applicable industry standards for products specified.
3. Division 01 Section "Closeout Procedures" for submitting warranties for contract closeout.
4. Division 02-33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.

3. Comparable Product: Product that is demonstrated and approved through submittal process, as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

B. It is the contractor's responsibility to show and prove to the Architect that the product substitution being requested is equal or better than that specified. Sending product brochures and product data by itself is not acceptable. Contractor to show a clear side by side comparison of specified products with proposed substituted products.

1. Substitution requests received that do not clearly show the comparisons referenced above will be rejected.

2. Substitution Request Form: Use form provided at end of Section.

3. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

j. Cost information, including a proposal of credit, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

4. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 21 days of receipt of request, or 15 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Architect's Acceptance.

b. Use product specified if Architect is unable to make a decision on use of a proposed substitution within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures". Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

5. Store products to allow for inspection and measurement of quantity or counting of units.

6. Store materials in a manner that will not endanger Project structure.

7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation and weather-protection requirements for storage.

9. Protect stored products from damage.

B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.

3. Refer to Division 01 Section “Closeout Procedures” for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.1 PRODUCT OPTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.

5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.

6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.

   a. Substitutions may be considered**,** unless otherwise indicated.

2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.

   a. Substitutions may be considered**,** unless otherwise indicated.

3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

   a. Substitutions may be considered**,** unless otherwise indicated.

4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

   a. Substitutions may be considered**,** unless otherwise indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product, by a named manufacturer. Fort a product by an unnamed manufacturer, submit a "substitution request" complying with the contract documents.

7. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.

8. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product[**s**]" are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product by a named manufacturer.

    a. Substitutions may be considered**,** unless otherwise indicated.

9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.

    a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.

10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern or texture from manufacturer's product line that does not include premium items.

    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern or texture from manufacturer's product line that includes both standard and premium items.

11. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 01 for allowances that control product selection and for procedures required for processing such selections.

2.2 PRODUCT SUBSTITUTIONS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

A. Timing: Architect will consider requests for substitution if received within 45 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, sustainability, compliance with intent and requirements, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner and similar considerations.

2. Requested substitution does not require extensive revisions to the Contract Documents.

3. Requested substitution is consistent with the Contract Documents and will produce indicated results.

4. Substitution request is fully documented and properly submitted.

5. Requested substitution will not adversely affect Contractor's Construction Schedule.

6. Requested substitution has received necessary approvals of authorities having jurisdiction.

7. Requested substitution is compatible with other portions of the Work.

8. Requested substitution has been coordinated with other portions of the Work.

9. Requested substitution provides specified warranty.

10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product (where a manufacturer is not named, the product substitution process is required):

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, sustainability, weight, size, durability, visual effect, and specific features and requirements indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

SUBSTITUTION REQUEST

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: __New product __2-5 years old __5-10 years old __More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached – REQUIRED BY A/E

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: __No __Yes; explain _____

_____

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Savings to Owner for accepting substitution: _____ ($ _____)

Proposed substitution changes Contract Time: __No __Yes (Add) (Deduct) _____ days.

Supporting Data Attached: __Drawings __Product Data __Tests __Reports __Other _____
The undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the work as necessary for accepted substitution will be complete in all respects.
- The undersigned agrees to pay costs associated with acceptance of proposed substitution necessitating changes to design, details, and construction, including associated architectural, engineering and consultant fees.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: _____

A/E – REVIEW AND ACTION

- ☐ Substitution approved – Make submittals in accordance with Specification Section 01 3300.
- ☐ Substitution approved as noted – Make submittals in accordance with Specification Section 01 3300.
- ☐ Substitution rejected – Use specified materials.
- ☐ Substitution Request received too late – Use specified materials.

Signed by:_____Date:_____

Additional Comments: __Contractor __Subcontractor __Supplier __Manufacturer __A/E _____

_____

_____

END OF SUBSTITUTION REQUEST FORM

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.

2. Field engineering and surveying.

3. General installation of products.

4. Coordination of Owner-installed products.

5. Progress cleaning.

6. Starting and adjusting.

7. Protection of installed construction.

8. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.

2. Division 01 Section "Closeout Procedures" for submitting final Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels and final cleaning.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, infiltration system, and water-service piping; and underground electrical services.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect and Owner not less than fourteen (14) days in advance of proposed utility interruptions.

C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. It is the contractor's responsibility to pre-plan for construction staging, access, site maintenance and compliance with applicable codes, laws and local governing jurisdictions for working at an on the site.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project. Maintain benchmarks throughout construction.

2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

3. Inform installers of lines and levels to which they must comply.

4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including but not limited to temporary and permanent access, pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework. Include with record documents.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise directed in writing by Architect.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective or poorly installed work as it occurs. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, properly adjusting operating equipment and poorly installed work per the Architects discretion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 21, 22, 23, 26, 27 and 28 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.

1. Primary operational systems and equipment.

2. Air or smoke barriers.

3. Fire-protection systems.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Control systems.

5. Communication systems.

6. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.

2. Membranes and flashings.

3. Equipment supports.

4. Piping, ductwork, vessels, and equipment.

5. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced and specialized firm.

a. Processed concrete finishes.

b. Ornamental metal.

c. Matched-veneer woodwork.

d. Roofing.

e. Firestopping.

f. HVAC enclosures, cabinets, or covers.

E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 WARRANTY

A. Existing Warranties: Remove, replace, patch and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete: Cut using a cutting machine, such as a diamond blade saw or a diamond-core drill. Make concrete repair cuts at locations that blend with concrete joint design.

4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Ceilings: Patch, repair or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

G. Material Waste Stream: A flow of materials coming from a job site into markets for building materials. Including either 1) a specific material category that is diverted in a specific way or 2) a mixture of several material categories that are diverted in a specific way. A waste stream must constitute a minimum of 5% (by weight or volume) of total diverted materials.

1.4 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total non-hazardous solid waste generated by the Work using the calculation standard defined by LEED NC v4.1 MRc5. Materials salvaged or recycled from demolition and construction waste must

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

come from a minimum of 4 (four) different material waste streams. Facilitate recycling and salvage of materials including the following:

1. Demolition Waste:

    a. Asphalt paving.
    b. Concrete.
    c. Concrete reinforcing steel.
    d. Brick.
    e. Concrete masonry units.
    f. Wood studs.
    g. Wood joists.
    h. Plywood and oriented strand board.
    i. Wood paneling.
    j. Wood trim.
    k. Structural and miscellaneous steel.
    l. Rough hardware.
    m. Roofing.
    n. Insulation.
    o. Doors and frames.
    p. Door hardware.
    q. Windows.
    r. Glazing.
    s. Metal studs.
    t. Gypsum board.
    u. Acoustical tile and panels.
    v. Carpet.
    w. Carpet pad.
    x. Demountable partitions.
    y. Equipment.
    z. Cabinets.
    aa. Plumbing fixtures.
    bb. Piping.
    cc. Supports and hangers.
    dd. Valves.
    ee. Sprinklers.
    ff. Mechanical equipment.
    gg. Refrigerants.
    hh. Electrical conduit.
    ii. Copper wiring.
    jj. Lighting fixtures.
    kk. Lamps.
    ll. Ballasts.
    mm. Electrical devices.
    nn. Switchgear and panelboards.
    oo. Transformers.

2. Construction Waste:

    a. Masonry and CMU.
    b. Lumber.
    c. Wood sheet materials.
    d. Wood trim.
    e. Metals.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

f. Roofing.
g. Insulation.
h. Carpet and pad.
i. Gypsum board.
j. Piping.
k. Electrical conduit.
l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
   1) Paper.
   2) Cardboard.
   3) Boxes.
   4) Plastic sheet and film.
   5) Polystyrene packaging.
   6) Wood crates.
   7) Plastic pails.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed. Waste Management Plan calculation methods to comply with standards as defined by LEED NC v4.1 MRc5.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons (tonnes).
4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work using the calculation standard designed by LEED NC v4.1 MRc5.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. LEED Submittal: Submit documentation to USGBC, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met. Respond to questions and requests from USGBC regarding construction waste management and disposal until the USGBC has made its determination on the Project's LEED certification application. Document correspondence with USGBC as informational submittals.

H. Qualification Data: For waste management coordinator and refrigerant recovery technician.

I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.

1. Firm employs a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator.
2. Waste management coordinator may also serve as LEED coordinator.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:
1. https://kingcounty.gov/depts/dnrp/solid-waste/programs/green-building/construction-demolition.aspx
2. “Seattle/King County Construction Recycling Directory.”

C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

D. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements and LEED MRc5 requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

E. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

F. Materials salvaged or recycled from demolition and construction waste must come from a minimum of 4 (four) different material waste streams

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.3 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Break up and transport paving to asphalt-recycling facility.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Clean and stack undamaged, whole masonry units on wood pallets.
2. Break up and transport paving to asphalt-recycling facility.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

I. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

J. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

K. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

M. Conduit: Reduce conduit to straight lengths and store by type and size.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial and Final Completion Inspection Procedures.
2. Project Record Documents.
3. Operation and maintenance Manuals.
4. Warranties.
5. Instruction of Owner's personnel.
6. Final cleaning.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section “Sustainable Design Requirements” for LEED requirements and documentation.
4. Division 01 Section “General Commissioning Requirements” for Commissioning requirements and documentation.

5. Divisions 03 through 33 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Have requested and received final certificate of occupancy from local authority.
2. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.

3. Advise Owner of pending insurance changeover requirements and submit evidence of final continuing insurance coverage.
4. Prepare and submit final LEED certification documents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

5. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications and similar documents for Architects review.
6. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates and similar releases.

7. Complete startup testing of systems.
8. Submit test/adjust/balance records.
9. Submit Commissioning reports as required.
10. Prepare and submit operation and maintenance manuals, damage or settlement surveys and similar final record information.
11. Deliver tools, spare parts, extra materials and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

12. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
13. Terminate and remove temporary facilities from Project site, along with mockups, construction tools and similar elements.
14. Advise Owner of changeover in heat and other utilities.
15. Submit changeover information related to Owner's occupancy, use, operation and maintenance.

16. Complete final cleaning requirements, including touchup painting.
17. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Owner and Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner/Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. The Owner and Architect will repeat inspection one time when requested and assured that the Work is substantially complete.
3. Time spent reviewing items not completed will be billed and paid to the Architect or Consultant at their customarily hourly rates by the Contractor through the Owner. Any additional site visits for reviewing uncompleted items will be subject to the same conditions above.
4. Results of the completed inspection(s) will form the basis of requirements for final acceptance.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. All requirements of Substantial Completion must have been met.
2. Submit Final Change Order.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
4. Submit certified copy of the Substantial Completion inspection list of items to be completed or corrected (punchlist). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
5. Obtain permanent occupancy permits and submit a copy of all closed or signed off permits required for the project.
6. Submit "Affidavit of Payments of Debts and Claims" from the contractor. AIA form G706 or equivalent.
7. Submit "Affidavit of Release of Liens" AIA form G706A or equivalent.
8. Submit evidence of final, continuing insurance coverage complying with insurance requirements will remain in force after final payment, is currently in effect and will not be cancelled or allowed to expire at least 30 days after written cancellation notice has been given to the owner.
9. Submit a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the contract documents.
10. Submit a "Consent of Surety to Final Payment". AIA form G707 or equivalent form
11. Submit affidavits of wages paid pursuant with RCW 39.12.040.
12. Submit certification that all materials used are Lead and Asbestos free.
13. Complete final cleaning

14. All Warranties, Guarantees, training, manuals, operation instructions, certificates, as-built drawings and other Project Record Documents, maintenance manuals, training or items required by the Contract Documents or local governmental entities have been provided.
15. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
16. Submit final meter readings for utilities, a measured record of stored fuel and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.

B. Final Inspection: Contractor shall submit a written request for final inspection for acceptance. On receipt of request, Owner and Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. After inspection the Owner will either prepare a final letter of acceptance or will notify Contractor of construction that must be completed or corrected before acceptance will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspection(s) as incomplete is completed or corrected.

C. Final Letter of Acceptance: After final inspection is approved, Architect will prepare a letter stating that the work is complete and recommends final acceptance and will certify the final application for payment may be issued.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first proceeding from lowest floor to highest floor.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

B. Submit the approved permit set of plans with Project Record Documents.

C. Record Drawings (As-built Drawings): Maintain one set of black-line white prints of Contract Drawings and Shop Drawings. Submit one set of (24" x 36") black and white Contract Drawings and one set of Contract Drawings shot on to mylars or other media approved by owner, one scanned electronic copy of as-builts and one set of Shop Drawings submitted on a CD.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity that obtained record data, whether individual or entity is Installer, subcontractor or similar entity, to prepare the marked-up Record Prints.
    a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    b. Accurately record information in an understandable drawing technique, clearly and legibly.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
    d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Mark Record prints with information regarding location of all existing or new underground piping, valves, conduit, cabling and utilities, as located during the course of construction activity. Identify any electrical or mechanical deviations from original drawings.
5. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
6. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Record Specifications: Submit one paper copy and one scanned electronic copy submitted on a CD of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders and Record Drawings where applicable.

E. Record Product Data: Submit one paper copy and one scanned electronic copy submitted on a CD of each Product Data submittal. For each substitution mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders and Record Drawings where applicable.

F. Record Survey: Provide final “Certified Survey” documentation per Section 01 73 00 and verify the actual property corners, Building corner locations and elevations, slope of handicap stalls and location of other major site elements. Provide information on survey plan dated and signed by surveyor including one scanned electronic copy submitted on a CD

G. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference. Provide one scanned electronic copy submitted on a CD

1.7 MECHANICAL SYSTEM COMMISSIONING, BALANCING AND DOCUMENTATION

A. Obtain compiled commissioning data from Commissioning Authority for inclusion in the Operations and Maintenance Manuals.

B. All HVAC control systems and other automatically controlled systems for which energy consumption performance, or mode of operation and regulated by WAC 51-11-1416 shall require systems commissioning. Preliminary and final reports including record drawings, maintenance manual submittals, system balancing and documentation shall be submitted in accordance with mandated completion requirements.

1.8 OPERATION AND MAINTENANCE MANUALS

A. Assemble two complete sets and one scanned electronic copy set submitted on a CD, of operation and maintenance data indicating the operation and maintenance of each system, subsystem and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Operation Data:

   a. Emergency instructions and procedures.
   b. System, subsystem, and equipment descriptions, including operating standards.
   c. Operating procedures, including startup, shutdown, seasonal and weekend operations.
   d. Description of controls and sequence of operations.
   e. Piping diagrams.
   f. Mechanical systems Testing and balancing report
   g. Commissioning report

2. Maintenance Data:

   a. Manufacturer's information, product information, including list of spare parts.
   b. Name, address, and telephone number of Installer or supplier.
   c. Maintenance procedures.
   d. Maintenance and service schedules for preventive and routine maintenance.
   e. Maintenance record forms.
   f. Sources of spare parts and maintenance materials.
   g. Copies of maintenance service agreements.
   h. Copies of warranties and bonds.
   i. Color and paint selections with associated product numbers and manufacturers.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.9 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, and thicknesses as necessary to accommodate contents and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name and name of Contractor.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

E. Provide one scanned electronic copy of each warranty submitted on a CD

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate and maintain systems, subsystems and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner, with at least seven days' advance notice.
4. Coordinate instructors, including providing notification of dates, times, length of instruction and course content.
5. Digitally record all training sessions and provide copy of the recorded information on a DVD to owner.

B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations.
4. Adjustments.
5. Troubleshooting.
6. Maintenance.
7. Repair.

3.2 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

regulations. Adhere to ASTM E1971 – 05 Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings for final cleaning.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter and other foreign substances.
   b. Sweep paved areas broom clean. Remove petrochemical spills, stains and other foreign deposits.
   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   d. Remove tools, construction equipment, machinery and surplus material from Project site.
   e. Remove snow and ice to provide safe access to building.
   f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
   g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
   h. Sweep concrete floors broom clean in unoccupied spaces.
   i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
   j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
   k. Remove labels that are not permanent.
   l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

      1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

   m. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
   n. Replace parts subject to unusual operating conditions.
   o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
   p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers and grills.
   q. Clean ducts, blowers, and coils if units were operated without filters during construction.
   r. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use and

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

D. Repeat cleaning operations as required resulting from repairs and continued work performed prior to requesting final inspection

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 01 Section "Submittal Procedures" specifies procedures for submitting warranties.
2. Division 01 Section "Closeout Procedures" specifies contract closeout procedures.
3. Divisions 03 – 33 for specific requirements for warranties on products and installations specified to be warranted.
4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Nor shall warranty periods be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

A. Submit written warranties to the Architect prior to the date of Completion.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.

C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual. Provide an additional scanned electronic copy submitted on a CD.

D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

product or installation, including the name of the product, and the name, address, and telephone number of the Installer.

2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

T C A

architecture • planning

Warranty Repair Request

City of Kirkland - Fire Station 24

Directions: Please complete the information request blocks below and fax or e-transmit to _____ for action. DO NOT sen this form to any of the subcontractors or suppliers as we will be unable to track the warranty and respond to you. You will be contacted to provide access and/or with the disposition.

Date Issued: Time:	Incident #:

Initiated by	Warranty Item (short name):
Name:_____ Organization:_____ Phone:_____ Fax Number:_____ E-Mail:	

Location of warranty item:	Draw a diagram if necessary:
Description of problem and indications (detailed):	

Subcontractor / Contractor Response

Describe Repair made:	
Work Performed by:	Date work Performed:

Owner Response

-

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) **Gold** certification based on USGBC's LEED v4 BD+C.

1. Specific requirements for LEED are also included in other Sections.
2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
3. A copy of the LEED Project checklist is attached at the end of this Section for information only.

    a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.

    b. LEED v4.1 BD+C is used for some credits.

1.3 DEFINITIONS

A. LEED: USGBC's "LEED Version 4 for Building Design and Construction."

1. Definitions that are a part of "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) apply to this Section.

B. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

C. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

D. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**. Review LEED requirements and action plans for meeting requirements.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Respond to questions and requests from Architect and the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application. Document responses as informational submittals.

B. Submit documentation to USGBC and respond to questions and requests from USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application.

1. Document correspondence with USGBC as informational submittals.

1.6 ACTION SUBMITTALS

A. General: Submit additional sustainable design submittals required by other Specification Sections.

B. Sustainable design submittals are in addition to other submittals.

1. If submitted item is identical to that submitted to comply with other requirements, include an additional copy with other submittal as a record copy of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."

C. Sustainable Design Documentation Submittals:

1. Documentation complying with Section 01 74 19 "Construction Waste Management and Disposal."
2. Product data for adhesives and sealants used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
3. Product data for paints and coatings used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.
5. Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.
6. Laboratory test reports for ceilings, walls, and thermal insulation, indicating compliance with requirements for low-emitting materials.
7. Construction Indoor-Air-Quality (IAQ): See 01 81 19

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For LEED coordinator.

B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:

1. Plumbing.
2. Mechanical.
3. Electrical.
4. Specialty items, such as elevators and equipment.

C. Sustainable Design Action Plans: Provide preliminary submittals within **seven** days of date established for **the Notice to Proceed**, indicating how the following requirements will be met:
1. Waste management plan complying with Section 01 74 19 "Construction Waste Management and Disposal."
2. Construction IAQ management plan.

D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.

1.8 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-accredited professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to these LEED credits, the Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.2 LOW-EMITTING MATERIALS

A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Clear Wood Finishes, Varnishes: 275 g/L.
9. Clear Wood Finishes, Lacquers: 275 g/L.
10. Floor Coatings: 50 g/L.
11. Shellacs, Clear: 730 g/L.
12. Shellacs, Pigmented: 550 g/L.
13. Stains: 100 g/L.

B. Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Wood Glues: 30 g/L.
2. Metal-to-Metal Adhesives: 30 g/L.
3. Adhesives for Porous Materials (Except Wood): 50 g/L.
4. Subfloor Adhesives: 50 g/L.
5. Plastic Foam Adhesives: 50 g/L.
6. Carpet Adhesives: 50 g/L.
7. Carpet Pad Adhesives: 50 g/L.
8. VCT and Asphalt Tile Adhesives: 50 g/L.
9. Cove Base Adhesives: 50 g/L.
10. Gypsum Board and Panel Adhesives: 50 g/L.
11. Rubber Floor Adhesives: 60 g/L.
12. Ceramic Tile Adhesives: 65 g/L.
13. Multipurpose Construction Adhesives: 70 g/L.
14. Fiberglass Adhesives: 80 g/L.
15. Contact Adhesives: 80 g/L.
16. Structural Glazing Adhesives: 100 g/L.
17. Wood Flooring Adhesives: 100 g/L.
18. Structural Wood Member Adhesives: 140 g/L.
19. Single-Ply Roof Membrane Adhesives: 250 g/L.
20. Special-Purpose Contact Adhesives (That Are Used to Bond Melamine-Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any Surface): 250 g/L.
21. Top and Trim Adhesives: 250 g/L.
22. Plastic Cement Welding Compounds: 250 g/L.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

23. ABS Welding Compounds: 325 g/L.
24. CPVC Welding Compounds: 490 g/L.
25. PVC Welding Compounds: 510 g/L.
26. Adhesive Primer for Plastic: 550 g/L.
27. Sheet-Applied Rubber Lining Adhesives: 850 g/L.
28. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
29. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
30. Special-Purpose Aerosol Adhesives (All Types): 70 percent by weight.
31. Other Adhesives: 250 g/L.
32. Architectural Sealants: 250 g/L.
33. Nonmembrane Roof Sealants: 300 g/L.
34. Single-Ply Roof Membrane Sealants: 450 g/L.
35. Other Sealants: 420 g/L.
36. Sealant Primers for Nonporous Substrates: 250 g/L.
37. Sealant Primers for Porous Substrates: 775 g/L.
38. Modified Bituminous Sealant Primers: 500 g/L.
39. Other Sealant Primers: 750 g/L.

D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Flooring: Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Composite Wood: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

G. Ceilings, Walls, and Thermal Insulation: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 NONSMOKING BUILDING

A. Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Comply with Section 01 74 19 "Construction Waste Management and Disposal."

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.3 CONSTRUCTION IAQ MANAGEMENT

A. See 01 81 19 Indoor Air Quality

3.4 IAQ ASSESSMENT

A. Flush-Out: See Section 01 81 19 Indoor Air Quality

B. Air-Quality Testing: **Owner will engage** testing agency to perform the following:

1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED Reference Guide for Building Design and Construction."
2. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:

    a. Formaldehyde: 27 ppb.
    b. Particulates (PM10): 50 micrograms/cu. m.
    c. Ozone: 0.075 ppm, according to ASTM D 5149.
    d. Total Volatile Organic Compounds: 500 micrograms/cu. m.
    e. 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m.
    f. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
    g. Target Chemicals in California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1 (except formaldehyde): Allowable concentrations in California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1.

3. For each sampling point where the maximum concentration limits are exceeded, take corrective action until requirements have been met.
4. Air-sample testing shall be conducted as follows:

    a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside-air flow rate for the occupied mode throughout the duration of the air testing.
    b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are encouraged, but not required, to be in place for the testing.
    c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 sq. ft. (465 sq. m).
    d. Air samples shall be collected between 3 and 6 feet (900 and 1800 mm) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Provide an Indoor Air Quality (IAQ) Management Plan to assure and demonstrate that the equipment and operation of equipment and systems during construction are made in a manner that maintains the cleanliness of system components and maintains a healthy indoor environment for workers and future occupants. Include the following:
a. Meet or exceed minimum requirements recommended in Design Approaches of the Sheet Metal and Air Conditioning National Contractor's Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction.
b. Protect absorptive materials that are stored on-site or installed from moisture damage. To the extent feasible, dry materials such as carpet, acoustical panel, textiles, and the like shall not be installed until wet materials have been applied and allowed to dry.
c. During construction, filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8, per ASHRAE 52.2, for filters used to protect HVAC at each return air grille, in addition to air handling equipment filters. Replace filtration media prior to occupancy.
d. Program to limit conditions supporting formations of microbes, molds, and fungi.
2. Prepare an Indoor Air Quality (IAQ) Management Plan Final Report at the end of Project construction.
3. Perform building flush-out after construction and before occupancy.
4. Test air change effectiveness after completion of construction.

1.02 PROJECT GOALS

A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in existing building.

B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
1. Furnish products meeting the specifications.
2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 REFERENCES

A. Applicable provisions of the following standards shall apply to the work of this Section, except as modified herein, and are hereby made a part of these Contract Specifications to the extent required:

ASHRAE Std 62 Ventilation For Acceptable Indoor Air Quality; 2016

1.04 DEFINITIONS

A. Absorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.

B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Indoor Air Quality Management Plan: A document specific to a building project that outlines measures to minimize contamination in the building during construction.

D. Particulates: Dust, dirt, and other airborne solid matter.

E. VOC: Volatile organic compounds.

F. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.05 SUBMITTALS

A. Submit in accordance with Sections 01 33 00, Submittal Procedures:
   1. Indoor Air Quality Management Plan: The Contractor shall prepare the plan and describe in detail measures to be taken to promote adequate indoor air quality during construction; use SMACNA IAQ Guidelines for Occupied Buildings Under Construction as a guide.
      a. A draft of the plan shall be submitted at the Pre-Construction Meeting. Final plan shall be submitted prior to approval of the Application for Initial Payment. Plan shall be implemented prior to commencement of construction activities.
      b. Identify potential sources of odor and dust.
      c. Identify construction activities likely to produce odor or dust.
      d. Describe fume, dust, and odor suppression methods and auxiliary air filtration and cleaning.
      e. Evaluate potential problems by severity and describe methods of control.
      f. Describe construction ventilation to be provided, including type and duration of ventilation. Use of permanent HVAC systems is not permitted during construction.
      g. Identify low hazard and low emitting materials to be used.
   2. Indoor Air Quality Management Plan Final Report: Within 10 calendar days of Substantial Completion, the Contractor shall submit a final report on the Indoor Air Quality Management of the Project. The report shall declare that the 5 Design Approaches of SMACNA IAQ guidelines for Occupied Buildings Under Construction; 2008, were used during construction. The final report shall contain:
      a. Listing of the important design approaches employed.
      b. Lists for each filtration media used during and at the end of construction, including the MERV value, manufacturer name and model number.
      c. A copy of the Indoor Air Quality Management Plan as approved.
   3. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.
   4. Duct and Terminal Unit Inspection Report.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 CONSTRUCTION PROCEDURES - GENERAL

A. Prevent the absorption of moisture and humidity by adsorptive materials by:
   1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
3. Provide sufficient ventilation for drying within reasonable time frame.

B. If extremely dusty or dirty work must be conducted inside the building, shut down construction heating and ventilation systems for the duration; remove dust and dirt completely before restarting systems.

C. Fabricated products shall be pre-finished off-site wherever practical and to the greatest extent possible. The use of spray equipment for applying finishes in buildings shall be used only upon approval of Owner.

D. Microfungal Contamination Control:
1. Perform, schedule, and sequence Work as required to limit conditions supporting formations of microbes, molds, and fungi.
   a. Control water penetration, dampness, and humidity to prevent products not treated for exterior use from becoming soaked or damp.
   b. Enclose building prior to installing interior materials and finishes.
   c. Do not install interior products subject to moisture absorption until building is enclosed and wet work generating moisture and humidity is complete.
2. When visible formations are observed and when formations cannot be completely removed by non-abrasive surface cleaning:
   a. Remove and replace materials which are identified as food sources for microbes, molds, and fungi.
   b. Correct conditions supporting microbial, mold, and fungal growth.
3. Remove interior products and finishes, identified as food sources, which have been made damp or have been soaked through whether or not microbial, mold, or fungal growth is observed. Include:
   a. Gypsum board cores
   b. Organic materials composed of cellulose fiber or paper
   c. Materials containing sucrose or other binders identified as supporting microbial growth.
4. Remove fibrous insulation materials subject to retaining moisture such as duct liner, insulation, and other materials which are made wet or damp and cannot immediately be made dry.
5. Repair or replace ductwork, pans, and other conditions subject to moisture condensation, water penetration, or other water source not drained and made dry.
   a. Remove conditions which have become an environment for microbes, molds, or fungi.
   b. Do not permit conditions leading to standing water.
6. Install wet work and allow time needed to dry and cure prior to installing materials such as carpet, acoustical material, textiles, and other materials subject to attracting and retaining moisture.
7. Remedial Action: Promptly take action as necessary to inspect and remediate suspected microbial fungal or mold conditions.

E. Provide temporary seal over open ends of newly installed ductwork during the construction duration, until initial startup of associated HVAC system equipment.

F. HVAC equipment and supply air ductwork shall not be used for ventilation during construction.

G. Do not store construction materials or waste in mechanical or electrical rooms.

H. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

3.02 BUILDING FLUSH-OUT

A. Perform building flush-out before occupancy.

B. Do not start flush-out until:
1. Construction is complete. Obtain Owner's concurrence that construction is complete enough before beginning flush-out.
2. HVAC systems have been tested, adjusted, and balanced for proper operation.
3. Cleaning of inside of HVAC ductwork, specified elsewhere, has been completed.
4. New HVAC filtration media have been installed.

C. Building Flush-Out: After construction ends, prior to occupancy and with all interior finishes installed, perform a flush-out of the affected building spaces by supplying a minimum outdoor air volume of 3,500 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60°F and relative humidity no higher than 60% where cooling mechanisms are operated. Continue flush-out as necessary until air quality testing per LEED "Indoor Air Quality Assessment" Credit is achieved.

D. Provide a description of the project's pre-occupancy flush-out process. Include data regarding temperature, airflow, and duration of flush-out. Additionally, provide information regarding special considerations.

E. Post Flush-Out
1. Upon completion of construction, return HVAC and lighting systems to the designed or modified sequence of operations.
2. If additional construction involving materials that produce particulates or any of the specified contaminants is conducted during flush-out, start the flush-out over.

F. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Description of Work
2. Payment Requirements and Commissioning Schedule of Values
3. Commissioning Coordination and Meetings
4. Scheduling Commissioning Activities
5. Submittals
6. Duties of Commissioning Authority
7. Duties of Contractor
8. Duties of Contractor's Commissioning Coordinator
9. Back-Charging Provisions
10. Documentation Requirements
11. Start-up Requirements
12. Installation Verification Requirements
13. Functional Testing Requirements
14. Commissioning Issue Documentation and Correction
15. Performance Period
16. Seasonal Testing
17. Near Warranty End Review

B. Related Sections:

1. General Requirements to include the following sections, exact titles may vary.

   Sustainable Building Requirements
   Indoor Air Quality
   Project Management and Coordination
   Submittal Procedures
   Closeout Procedures

2. The following sections specify the commissioning activities for this project:

   22 08 00 Commissioning of Plumbing
   23 08 00 Commissioning of HVAC
   26 08 00 Commissioning of Electrical Systems

3. All sections related to the following commissioned systems may contain start-up, testing and/or commissioning related activities:

   DIVISION 22 – PLUMBING

      Domestic Hot Water & Circulator

   DIVISION 23 – HVAC

      HVAC Systems

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Building Automation and Control Systems
Testing, Adjusting and Balancing

DIVISION 26 – ELECTRICAL SYSTEMS

Lighting Control
Photovoltaic Systems

1.2 DESCRIPTION OF WORK

A. Work includes the completion of formal commissioning procedures on selected equipment and systems as outlined in the paragraph Related Sections above. Commissioning is defined as the process of verifying and documenting that the installation and performance of selected building systems meet the specified design criteria and therefore satisfies the design intent and the Owner's operational needs. The Contractor shall be responsible for participation in the commissioning process as outlined herein, and in subsequent sectional references and attachments throughout the Contract Documents. Commissioning procedures will be designed and conducted under the direction of a Commissioning Authority (CxA) hired by the Owner.

B. This section contains the general requirements for commissioning and a description of the commissioning process to be applied across all commissioned systems.

1.3 PAYMENT

A. Equipment and systems shall not be accepted by the Owner, and final payment shall not be made by the Owner, until commissioning activities identified in the specifications are complete, commissioning issues are resolved to the Owner's satisfaction and the performance period standards have been met.

B. Payment is subject to satisfying the Washington State Energy Code, Commercial Provision Section 408.1.4 which requires that commissioning be completed "Prior to the final mechanical, plumbing and electrical inspections or obtaining a certificate of occupancy".

C. Payment is subject to the conditions of the Actual Damages clause of the General Conditions.

1.4 COMMISSIONING COORDINATION AND MEETINGS

A. A representative for the Contractor, each commissioned system Contractor and the Contractor's Commissioning Coordinator (CCC) shall attend scheduled commissioning meetings as required.

1.5 SCHEDULE

A. The Contractor is responsible for coordination and scheduling of commissioning activities into the master schedule. The schedule shall contain the following activities and detail as a minimum.

1. Contractor review and comment on preliminary commissioning plan documents
2. Start-up Plan Development

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Start-up Activities by Equipment and Systems
4. Installation Verification Activities by Equipment and Systems
5. Functional Testing Activities by Equipment and Systems
6. Training
7. O&M
8. Seasonal Testing

B. The CCC shall develop and maintain a 2-week look-ahead schedule of commissioning activities including, but not limited to: meetings, start-up, installation verification, Functional Performance Testing (FPT) and FPT demonstration. The schedule shall be updated and distributed weekly, or if any currently scheduled activities in the 2-week period change.

C. The Owner and the CxA will allocate their time based on the 2-week look-ahead schedule. If the Owner or CxA is not available for the scheduled activity then the Contractor may proceed as scheduled. If a scheduled activity does not take place due to lack of Contractor participation or inaccurate scheduling, the Contractor is subject to back-charging as outlined herein.

1.6 SUBMITTALS

A. Commissioning Documentation: Provide one copy of submittals in addition to those quantities specified elsewhere. Include the manufacturer's recommended installation and start-up procedures with associated checklists for each unique piece of equipment under a separate tab titled "Installation/Start-up". These procedures and forms shall be for the specific piece of equipment to be provided.

B. The Contractor shall provide the CxA with copies of approved submittals, manufacturer's recommended installation/start-up documents, proposed testing formats, training plans, as-built documentation, O&M Manuals and other commissioning related materials as requested by the CxA. The CxA will review and approve this material for commissioning related activities.

C. The CCC is responsible for managing the submittal process with the CxA. A tracking document for selected submittals is included in the schedules at the end of the individual divisional commissioning specifications for systems to be commissioned. These schedules outline activities that will require specific submittal information by the Contractor. Assignment of Contractors responsible for commissioned systems and due dates will be determined at the initial commissioning coordination meeting.

D. O&M manuals for each piece of commissioned equipment are to be submitted with the proposed installation, testing and start-up documents.

E. The Contractor is responsible for providing the CxA with copies of the following information for inclusion in the Systems Manual. The CxA will review this material for compliance with Project Documents and will note and report issues for resolution by the responsible party. The CxA will compile the final Systems Manual based on the submitted documentation.

1. As-built documents
2. Description of systems, including capabilities and limitations
3. Operating procedures for all normal, abnormal, and emergency modes of operation

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Sequence of operation as actually implemented, with control systems data including all set points, calibration data, etc. This includes but is not limited to the building automation system, packaged controls, programmable logic controllers and lighting controls.
5. Location of all control sensors and test ports.
6. Seasonal start-up and shutdown procedures.
7. Control schematics and computer graphics for all control systems including those noted in item 4.
8. Complete terminal interface procedures and capabilities for all control systems including those noted in item 4.
9. A list of recommended operational recordkeeping procedures including sample forms, trend logs, or others, and a rationale for each
10. Maintenance procedures for all building systems.
11. Maintenance information for systems and equipment provided under Division 07 - Thermal Moisture and Protection, and Division 08 – Openings.

1.7 COMMISSIONING AUTHORITY

A. The information provided herein regarding the Commissioning Authority's (CxA) responsibilities is provided to the Contractor for information only and is not a part of the work scope. The CxA is hired under direct contract with the Owner.

B. The CxA for this project shall be Welsh Commissioning Group (WCG), Inc. (253) 856-3322, FAX (253) 859-2072 and web www.wcxg.com. WCG is a Building Commissioning Certification Board (BCCB) Certified Commissioning Firm. WCG has on staff ANSI/ISO/IEC 17024:2012 Certified Commissioning Professionals who will lead the commissioning process.

C. Responsibilities: The CxA responsibilities include, but are not limited to the following:

1. Approve selection of the CCC.
2. Participate in the initial on-site commissioning coordination meeting and subsequent commissioning meetings.
3. Conduct site observations and provide site observation reports.
4. Review and approve the start-up plan and commissioning schedule as developed by the CCC and the Contractor.
5. Develop the commissioning plan including start-up plan, installation verification checklists and functional test documents
6. Review and approve various Contractor completed documents including CCLs, start-up documents and data sheets as they are completed.
7. Witness, spot check or otherwise verify successful completion of selected functional testing by Contractor.
8. Review the TAB report. Witness or spot check a sample of the systems to verify conformance to design and the report.
9. Prepare and submit final commissioning report with recommendation for system acceptance to the Owner. Report is developed with material provided by CCC and Contractor.

1.8 CONTRACTOR

A. Contractor Responsibilities

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Support the commissioning process including integrating related commissioning activities into the construction process and schedule.
2. Assure the participation and cooperation of subcontractors as required to complete the commissioning process as outlined herein and the individual divisional commissioning specifications.
3. Assign a Commissioning Coordinator dedicated to the project.
4. Provide all submittal material as requested by the CxA and as required by the contract documents.
5. Attend commissioning meetings as scheduled.
6. Provide access to commissioned systems including ladders, lifts, scaffolding, access panels and other equipment as required.
7. Install and start-up equipment per the contract documents and start-up plan.
8. Conduct functional testing per the contract documents and commissioning plan
9. Provide required test instrumentation and equipment as needed to conduct functional testing per the commissioning plan.
10. Resolve issues as noted on the commissioning issues list and communicate resolution to the CxA.
11. Support seasonal testing as required.
12. Support the near-warranty-end review and correct any noted issues prior to warranty end.

1.9 CONTRACTOR'S COMMISSIONING COORDINATOR

A. Contractor's Commissioning Coordinator (CCC) Qualifications

1. The CCC shall be a regular employee of the Contractor assigned to the project. The CCC shall be responsible for coordination of Contractors responsible for commissioned system regardless of the Contractors they represent.
2. The CCC responsibilities shall not be shared by multiple parties, one individual shall be designated.
3. The individual designated as the CCC shall be available on site from the beginning of construction to final acceptance.
4. The individual designated as the CCC may have other construction or project related assignments, but only to the extent that they will be able to fulfil the CCC responsibilities outlined herein.
5. The individual designated as the CCC shall be identified by the Contractor during the submittal process.
6. Submit the name, company, contact information (address, phone, cell phone, FAX and e-mail) and other project duties for the proposed CCC.

B. Contractor's Commissioning Coordinator Responsibilities

1. Overall management and coordination of the commissioning work performed by the Contractors responsible for commissioned systems including responsibilities identified as the CCC's responsibility in each section on commissioned systems.
2. Coordinate Owner and CxA participation in scheduled commissioning activities. Notify Owner and CxA a minimum of 5 working days in advance of commissioning activities.
3. Collect, review and submit commissioning material and documentation to the CxA for approval prior to proceeding with commissioning activities including, but not limited to, the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Review and comment on preliminary functional tests provided by CxA. Contractors responsible for the systems to be commissioned shall also review this information.
b. Develop, manage and update commissioning schedule with commissioning activities
c. Proposed Manufacturer's installation and start-up documents
d. Proposed cleaning, flushing, testing, disinfection forms
e. Proposed Static tests and calibration forms
f. Start-up plan
g. Proposed functional performance test forms
h. Completed Manufacturer's installation and start-up documents
i. Completed cleaning, flushing, pressure testing, disinfection forms
j. Completed static tests and calibration forms
k. Completed Contractor Checklists
l. Completed functional performance test forms
m. TAB agenda
n. TAB preliminary and final report
o. Signed off issues lists
p. Proposed O&M Manuals
q. Training plans and agenda
r. Final O&M Manuals

4. Develop, manage and update commissioning schedule. Integrate commissioning activities into master schedule. Provide a 2-week look-ahead schedule of commissioning activities, updated weekly or as scheduled commissioning activities change during 2-week period.
5. Distribute issues lists to Contractors responsible for the commissioned systems.
6. Assemble, manage and update the start-up plan.
7. Attend regularly scheduled construction and Owner's meetings and review commissioning activities with Contractors responsible for the commissioned systems and design team. Include commissioning activity items in construction meeting minutes.
8. Participate in and lead commissioning meetings as necessary to coordinate contractor activities in the commissioning process. Meetings are generally to be scheduled once every two weeks during initial construction of commissioned systems, and weekly during start-up and functional test phases. The CxA shall lead commissioning meetings when on site and the CCC shall lead all other meetings.
9. Provide material for, participate in the development of, and review the final report.
10. Coordinate and participate in seasonal testing.

1.10 BACK-CHARGING

A. The Contractor and CCC are responsible to schedule and coordinate installation, start-up and testing activities with the CxA as specified herein and in each section on commissioned systems. Scheduled installation, start-up or testing activities that are not executed because of lack of preparation or coordination by the Contractor that result in unnecessary trips by the CxA are subject to back-charges to the Contractor.

B. Functional testing shall be performed on the systems that are fully complete as reported by the Contractor. Systems that are reprogrammed or have had a software upload that can be

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

shown to invalidate completed functional testing shall be retested to demonstrate proper operation. Tests re-conducted by the Contractor shall be performed at no additional cost to the contract. Tests re-conducted by the CxA shall result in a back-charge to the Contractor.

C. The Contractor shall reimburse the Owner for costs associated with any additional efforts required to witness installation, start-ups, testing activities or for excessive back-checking as indicated above. These costs shall include salary, travel costs and per diem lodging costs (where applicable) for the Commissioning Authority. Rates to be used will be per the contract between the Owner and Commissioning Authority.

PART 2 – PRODUCTS

2.1 DOCUMENTATION

A. Schedule-A (located at the end of each section on commissioned systems, XX-08-00) contains sample versions of the Contractor Checklists (CCL) to be used for the systems to be commissioned.

B. Schedule-B (located at the end of each section on commissioned systems, XX-08-00) contains a Functional Performance Test Summary Table that outlines each functional test to be conducted for the systems to be commissioned. Part 4 of each section on commissioned systems contain sample versions of functional performance test procedures and data sheets. These do not represent all functional tests that will be required and are intended only to demonstrate the rigor of functional testing required.

C. Paragraph 3.12 contains preliminary versions of the Contractor Closeout Checklists to be used for the systems to be commissioned.

2.2 INSTALLATION VERIFICATION

A. The CxA shall conduct an independent Installation Verification using checklists based on the Contractor Checklists provided in Schedule – A, located at the end of each section on commissioned systems.

2.3 STARTUP FORMS

A. Any installation and start-up checklists that are provided by the manufacturer shall be used in the equipment start-up process. Non-manufacturer developed forms must be approved by the CxA prior to use. Start-up forms must be submitted to the CCC for inclusion in the Start-up plan at least one month prior to system start-up to allow for review and approval by the CxA. Documentation for static testing, cleaning, flushing, calibration and other activities required by project documents are considered start-up forms. Schedule – A (located at the end of each section on commissioned systems) outlines the required documents to be submitted by the Contractor.

2.4 FUNCTIONAL PERFORMANCE TEST FORMS

A. The functional performance test procedures and data sheets shall be developed by the CxA as outlined in Schedule B (located at the end of each section on commissioned systems), with input from the CCC and Contractor as required.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. The Contractor has specific responsibilities for developing, performing and documenting functional test procedures as directed by the CxA. See Schedule – B for minimum testing and documentation requirements.

C. In addition to the testing outlined in Schedule – B, wherever the Project Documents require testing, test reports, checklists, verifying operation, demonstrating proper operation or other similar language with respect to the systems to be commissioned, written testing procedures and documentation of tests will be required from the Contractor, whether specified or not in the commissioning sections.

D. A tracking document for these submittals is included in Schedule - B which outlines which of these activities will require submittal information by the Contractor. Contractors responsible for the systems to be commissioned and due dates will be determined at the initial commissioning coordination meeting.

2.5 COMMISSIONING ISSUES LIST

A. The CxA shall maintain the Commissioning Issues List. At any time an issue is discovered where the installation or performance of the commissioned system does not meet contract document requirements, an individual issue shall be generated. As issues are resolved and verified by additional inspections or tests, the issues list shall be updated. The issues list shall be a running history of the status of the issue.

2.6 TEST EQUIPMENT

A. The Contractor shall provide all test equipment as required to prove performance during static and functional tests.

B. The test equipment shall be provided in sufficient quantities to execute functional testing in an expedient fashion.

C. The test equipment shall be of industrial quality and suitable for testing and calibration with accuracy within the tolerances necessary to demonstrate system performance.

D. Equipment shall be certified to an accuracy of 10% of the smallest tolerance to be measured. For example, if a temperature gage is required to be +2 degrees F, the calibration device must have an accuracy of +0.2 degrees F.

E. The test equipment shall have calibration certification per equipment manufacturer's interval level or within one year if not specified.

F. Where sensors for specific gases are used (e.g. carbon monoxide, nitrogen dioxide, refrigerant leak detectors, etc.) the Contractor shall provide appropriate test gases in order to validate calibration of sensors. Test gases shall be provided so as to validate sensor output for 0, 50 and 100 percent of the sensor range.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 – EXECUTION

3.1 DOCUMENTATION

A. Checklists, start-up documentation, test forms and other commissioning related documentation required by contract shall be neatly and legibly completed and provided to the CxA via the CCC in a clear and easily readable condition.

B. Required checklists, start-up documentation, test forms and other commissioning related documentation shall be provided to the CxA via the CCC in a timely fashion and according to the commissioning and construction schedule.

C. In every case where the Contractor is unable to comply with an item as listed on the checklist or form, the Contractor shall immediately notify the CxA in writing as to the reasons for non-compliance.

3.2 ACCESS TO EQUIPMENT AND SYSTEMS

A. The Contractor shall provide access to all equipment and systems to be commissioned both during construction and after occupancy as necessary. The Contractor shall coordinate with other trades to assure that access to commissioned equipment is available to the CxA and other trades at the proper times and with sufficient duration.

B. The Contractor shall provide all ladders, lifts, scaffolding, access doors, removal/installation of ceiling tiles and any other materials or activities as necessary to allow the CxA to easily access equipment and systems.

C. During the commissioning process, the Contractor shall coordinate the installation of ceiling tiles and other finishes to allow all trades and the CxA to perform their work without having to remove or reinstall ceiling tiles or other finished work. Note that above-ceiling access is required to perform Installation Verification and Functional Performance Testing of systems. Ceiling tiles typically must be in place during Testing and Balancing activities. Since Testing and Balancing may occur between Installation Verification and Functional Performance Testing, some ceiling tiles may require multiple removal/reinstallation cycles.

D. In the event that system commissioning is not fully completed after occupancy, the Contractor shall be responsible for coordinating with the owner for access to the equipment or system for testing, back-checking and other commissioning activities. This requirement shall include providing access to equipment as indicated above.

3.3 MEETINGS AND SITE OBSERVATIONS

A. Commissioning status meetings shall be scheduled to occur during the construction and closeout phase to monitor progress and to help facilitate the commissioning process. Contractor representatives for commissioned systems shall be required to attend these meetings. Meetings will generally be scheduled to occur with scheduled construction or management meetings. The CCC shall schedule, coordinate and lead the meetings including providing meeting minutes. These meetings can coincide with, or be a subset of, the normal subcontractor meetings. When the CxA is on site for commissioning duties or

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

scheduled meetings, the CxA shall lead the commissioning meetings and prepare and distribute minutes.

B. Commissioning shall be included in the general construction and Owner's meetings. The CCC will attend these meetings and discuss commissioning related topics there. Commissioning information and issues shall be documented in the meeting minutes.

C. The CxA may perform periodic site visits during construction to monitor commissioning activities. The purpose of these observations will be to evaluate compliance to contractual obligations such as cleanliness, capping ductwork, access to equipment, maintainability and so forth to identify concerns before they are repeated throughout the project. Any issues identified will be noted on a Site Observation Report. The Contractor shall review these reports and take action to resolve issues as needed and deemed appropriate in consultation with the Owner, CxA, and Design Team.

D. After functional testing and during the issue correction period, the Contractor shall hold weekly on-site meetings (as a minimum) to coordinate and review outstanding commissioning issues. These meetings shall be coordinated and led by the general contractor's CCC and attended by all sub-contractors responsible for commissioned systems. The meetings shall be required until all issues are resolved.

3.4 CONTROLS INTEGRATION MEETING – BUILDING AUTOMATION AND LIGHTING

A. The controls integration meetings (CIM) shall be conducted after the building automation and lighting controls submittals are complete and the CxA has reviewed the submittals. The meetings are to be conducted prior to finalizing the functional test procedures and shall be attended by the CxA, the BAS control contractor, the VRF control contractor, the lighting controls contractor, the mechanical/electrical engineers and a representative of the Owner's maintenance group at a minimum. The CIM shall include, but not be limited to, the following topics:

1. Sequence of Operations
2. Alarm Points List
3. Trend Points List
4. Displayed/Adjustable Point List
5. Graphical Interface
6. Integration with packaged equipment
7. Lighting control interface
8. Point-to-Point Checkout and Commissioning of Existing Equipment
9. Method of Conducting Cx Functional Testing

3.5 PRE-STARTUP ACTIVITIES

A. The CxA shall develop a preliminary commissioning plan with input from the Contractors via the CCC.

B. As soon as possible after the bid award, approval of submittals and development of the preliminary commissioning plan, the CxA shall conduct an initial commissioning coordination meeting with the CxA, CCC, Contractors, Owner's Representative and the A/E Team. The CxA will explain the commissioning process in detail, and identify specific commissioning

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

related responsibilities. The preliminary commissioning plan shall be provided to the Contractors at this time. The requirements for submittal material shall be reviewed along with a preliminary schedule of commissioning activities.

C. The Contractor shall submit to the CxA via the CCC preliminary O&M manuals prior to developing the Start-up and Commissioning Plan by the CxA.

D. The Contractor shall submit to the CCC the proposed start-up and Contractor required testing documentation for assembly into the Start-up and Commissioning Plan by the CxA.

E. The CxA shall develop a Start-up Plan based on Contractor submittals and the start-up requirements of the contract documents. It details the procedures and forms for individual pieces of equipment and systems that have start-up and testing requirements. It shall be a three-ring binder indexed by system or equipment. The binder shall be populated with procedures and blank forms and used to file the completed forms as the procedures are completed by the Contractor. The Start-up Plan shall include, but is not limited to, the following:

1. List of commissioning team members.
2. Start-up document tracking forms.
3. Master list of equipment/systems for installation and start-up.
4. Start-up and static testing schedule.
5. Manufacturer and Project Document required installation, start-up and testing procedures
6. Blank copies of start-up and testing forms for each type of equipment/system.
7. Contractor checklists for each system.

F. The CxA shall develop the final commissioning plan. The commissioning plan typically includes, but is not limited to, the following:

1. Project overview.
2. Commissioning Authority scope of work.
3. Contractor's Commissioning Coordinator scope of work.
4. Roles and responsibilities of commissioning participants.
5. A schedule with sequential description of commissioning activities.
6. A complete list and description of equipment and systems to be commissioned.
7. The Start-up Plan
8. Installation verification data forms for systems and equipment to be commissioned.
9. Functional performance test criteria, test forms and data forms for systems and equipment designated to be functionally tested including trending needed for the performance period.
10. System integration testing plan.
11. Sample commissioning issues list.

G. The Contractor shall be responsible for the liability and safety of conducting tests. The CCC and Contractor shall review the Functional Performance Test (FPT) documents provided by the CxA prior to including them in the final commissioning plan. The Contractor is to review preliminary and final test procedures to verify that they:

1. Will not pose a risk of injury to any personnel.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Will not pose a risk of damage to equipment, structure or any physical element of the building.
3. Will not negate any equipment or system warranties.
4. Are executable with the personnel and equipment available to the Contractor.

3.6 EQUIPMENT INSTALLATION AND START-UP

A. Installation and Start-up activities include procedures outlined by the contract documents and the equipment manufacturer including cleaning, static testing, calibration and other related activities. The CxA shall provide the Contractor with a start-up plan based on Contractor submitted procedures and checklists.

B. The CxA may witness selected equipment start-up and testing performed during construction. The CCC shall keep the CxA informed of commissioning activities with regular status reports and updates to the commissioning plan, start-up plan and schedules

C. The Contractor shall perform equipment start-up per the approved start-up plan and start-up forms. The Contractor shall correct issues as they are discovered. The Contractor shall complete the installation and start-up forms as the work is complete and place the fully completed installation and start-up forms in the start-up binder.

D. Upon completing the start-up activities for a given system, the associated Contractor Checklists (CCL) shall be completed by the Contractor and placed in the appropriate tab section of the start-up binder. The completed and signed CCL is to be provided with the equipment manufacturer's recommended start-up form for each piece of equipment or system. The completed CCL is the Contractor's certification that they have completed all required installation and start-up activities and the system is ready for the installation verification audit by the CxA and subsequent functional performance testing.

E. The start-up binder shall be maintained by the Contractor's Commissioning Coordinator. The Contractor is responsible for maintaining the start-up book in good order and to turn the completed document over to the CxA at the conclusion of start-up. If the start-up binder is lost or stolen, it shall be the responsibility of the Contractor to recreate the binder and its contents, including re-conducting start-up activities if necessary.

F. Upon completion of all start-up activities including the required documentation, the Contractor shall submit the start-up binder to the CxA via the CCC for review and approval.

3.7 INSTALLATION VERIFICATION (IV)

A. The IV process shall begin when signed off CCLs and start-up documents are received from the Contractor.

B. The CxA shall conduct an independent installation verification audit on selected systems to verify conformance with manufacturer's installation instructions and project documents. The CxA shall use the completed CCL from the contractor to verify installation. Discrepancies discovered will be reported on the Commissioning Issues List by the CxA. A copy of the issues list will be transmitted to the Contractor via the CCC with a copy to the Owner and Design Team.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. The Contractor shall correct any issues discovered and note the action taken on the issues log and return it to the CxA via the CCC.

D. The CxA shall back-check and verify that the issues are resolved prior to proceeding with FPT.

3.8 FUNCTIONAL PERFORMANCE TESTS (FPT)

A. FPT includes the documented testing of system parameters, under actual or simulated operating conditions. Final performance testing of systems will begin only after the Contractor certifies that systems are 100% complete and ready for functional testing, by providing completed and signed-off copies of the start-up plan and providing completed Contractor Checklists.

B. Any testing procedures and forms which the Contractor is required to provide must be provided by the CCC to the CxA at least one month prior to start of installation of the equipment and as needed to complete the commissioning plan.

C. Functional performance testing of commissioned systems shall begin after all critical issues discovered during the start-up and installation verification process have been corrected. The CxA and Contractor shall conduct functional performance tests on selected systems to verify functional performance criteria as outlined in Schedule - B (located at the end of the individual divisional commissioning specifications) and as required in the Project Documents and approved by the CxA in the Commissioning Plan. Discrepancies discovered will be reported on the Commissioning Issues List by the CxA. A copy of the issues list will be transmitted to the Contractor via the CCC.

D. Functional tests that have excess failure rates or are aborted due to lack of Contractor participation or scheduling are subject to the back-charging provisions of the paragraph Back Charging.

E. The Contractor shall make available to the CxA a method of interfacing with any commissioned control systems at the building site including but not limited to the building automation system, packaged control systems, programmable logic controllers and lighting control systems. This interface shall be made available regardless of whether or not a permanent local work station is specified elsewhere in the contract documents. The on-site interface shall be made available from the time of completion of start-up activities until trending is complete and all commissioned systems are accepted by the owner. The Contractor shall also make available to the CxA a method of remote access to the control system(s) beginning at the time of completion of start-up activities and extending for one year after system acceptance. Remote and local access shall include all software, licensing, software keys and anything else required to facilitate full access to the system(s). The local and remote interfaces shall include all contract required interfaces including, but not limited to, all graphics, trends and alarms. The CxA shall be given an account with full security access privileges to the system(s).

3.9 COMMISSIONING ISSUE DOCUMENTATION AND CORRECTION

A. The commissioning issues list is generated and maintained by the CxA to include a description of the issue, date of posting, the current status of issues, assignment to the responsible party and the date of final resolution as confirmed by the CxA. Items listed may

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

include issues where design, products, execution or performance does not appear to satisfy the Contract Documents and the design intent. The resolution of issues identified on this list may or may not be the responsibility of the Contractor.

B. Once issues have been identified and assigned to a Contractor on the Commissioning Issues List, the Contractor shall be required to investigate and resolve these issues in a timely manner. After correcting issues noted on the Commissioning Issues List, the Contractor shall sign off on each issue and return the list to the CxA via the CCC for initiation of back-checking by the CxA.

C. In the event that an issue has been assigned to the wrong Contractor or resolution of the issue requires multiple trades, Contractor with the initial assignment shall take the lead in working with the CCC and CxA to reassign the issue or coordinating the multiple trades to resolve the issue.

D. The CxA shall back-check and verify that the commissioning issues are resolved and update the issues list. Excessive back-checking by the CxA due to issues reported as complete not actually being resolved are subject to the back-charging provisions of the paragraph Back Charging.

E. After functional testing and during the issue correction period, the Contractor shall hold weekly on-site meetings (as a minimum) to coordinate and review outstanding commissioning issues. These meetings shall be coordinated and led by the general contractor's CCC and attended by all sub-contractors responsible for commissioned systems. The meetings shall be required until all issues are resolved.

3.10 PERFORMANCE PERIOD

A. Performance Period: The performance period is a set length of time designated to demonstrate proper facility operation prior to acceptance. The performance period commences after successful completion of all functional testing. Parameters evaluated for heating and ventilation systems typically include zone temperature stability, optimum start/stop, warm-up period and other related functions. For lighting control the parameters include lighting levels, occupancy switching and daylight control. As part of this process the Contractor will be required to set up and provide trends of building automation system parameters per the direction of the CxA. The specific trending needed will be outlined in the commissioning plan, the Contractor should assume that all points in the building automation system will be trended. Lighting control parameters will be trended if system capabilities exist, otherwise the Contractor will provide stand-alone data loggers to demonstrate operation of systems.

B. The CxA shall prepare a performance period test plan including measured variables and success criteria based on performance characteristics described in the Project Documents. The CxA will provide the Contractor with a list of trend log definitions or stand-alone data logger requirements based on the performance period test plan included in the Commissioning Plan.

C. The Contractor will review the performance period test plan and set up the trend log definitions and stand-alone data loggers. Trend logs shall be set up for all inputs/outputs, both digital and analog, for all points in the system both physical and virtual. Trend interval shall be 5 minutes unless otherwise directed by the CxA. The minimum trend period shall

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

be 14 days. Trend log point headings as displayed on system graphs and data tables shall be adequately descriptive for the point but no longer than 12 characters unless approved by the CxA. System default names are not acceptable. The heading titles shall contain no extraneous characters that are not needed to describe the point. The contractor shall provide the trends to the Commissioning Authority in electronic format, in MS Excel or a comma delimited file with related system parameters grouped together for easy comparison. If building automation system resident memory is limited or there are other issues with the trending requirements, the Contractor will work with the CxA to redefine the test plan.

D. The performance period will commence within one week of the final functional tests and run for a minimum of 14 days. A similar performance period may be required for seasonal testing. If failures are encountered, the performance period shall be aborted. After corrections are made, the performance period shall be re-started at day one. Systems shall run per the final sequences of operation for 30 days without adjustments or corrections before the warranty period will commence.

3.11 SEASONAL TESTING

A. Seasonal testing is required to demonstrate the system's ability to meet design conditions associated with seasonal extremes, typically peak heating and peak cooling conditions.

B. Seasonal testing may also be required when ambient conditions will not support the operation of specific equipment.

C. Seasonal testing is required to demonstrate the performance for a fully occupied building or portion of the building as well as for systems that are occupancy sensitive.

D. The Contractor shall provide labor and material for seasonal testing and make corrections to any Contractor related issues discovered.

3.12 NEAR-WARRANTY-END REVIEW

A. Approximately two months prior to the end of warranty on commissioned systems, the Contractor shall participate in a review of the commissioned systems with the owner, design team and the CxA to identify any operational and outstanding issues. For this review, the Contractor shall schedule the attendance of appropriate parties with project specific knowledge, including but not limited to the following:

General Contractor
Mechanical Contractor
Building Management System Contractor
Variable Refrigerant Flow System Startup and Controls Contractor(s)
Lighting Controls Contractor(s)

B. The review shall consist of a meeting on site with the Contractor with follow up testing and verification by the Contractor.

C. A list of issues will be developed by the owner and CxA. Once issues have been identified, the Contractor shall investigate, test and inspect systems as necessary to identify and resolve warranty issues in a timely manner.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. The Contractor shall ensure the cooperation of appropriate Contractors responsible for the commissioned systems in any follow-up meetings, testing, inspections and investigation regarding warranty issues and in resolving, prior to the end of the warranty, any warranty issues discovered.

E. Issues identified in this review will remain warranty items until satisfactory completion, even if the warranty period expires during the review and correction period.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work includes but is not limited to: Maintenance of pedestrian and vehicular access around project construction. Maintenance of existing surface improvement and utilities intended to remain.

1.2 RELATED SECTIONS

A. Coordinate and comply with the following sections:

1. 02 40 00 – Demolition

1.3 REFERENCE STANDARDS

A. The City of Kirkland (COK) pre-approved plans and policies, January 1, 2020 edition.

B. The Northshore Utility District (NUD) Standard Specification and Details, February 2020

1. Washington Department of Transportation (WSDOT) Standard Specifications and Standard plans for Road, Bridge and Municipal Construction, 2020 edition.

2. The Standard Specifications apply only to the construction requirements and materials and how they are to be incorporated into the Work. If referenced standards conflict the more stringent specification shall apply. The legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

1.4 SUBMITTALS

A. See Division 01 Submittal Procedures.

B. Contractor shall prepare and submit Traffic Control plans to maintain vehicular and pedestrian access to adjacent properties and maintain traffic around the project site for review and approval by Owner's Representative. The traffic control plan shall be in conformance with WSDOT Standard Plans and Specifications Section 1-10 and with COK requirements.

1.5 COORDINATION

A. Contractor shall coordinate and provide construction schedule and sequencing to Owner's Representative.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Contractor shall coordinate with utility providers in the vicinity of the project to maintain or relocate services as necessary to allow for construction activities.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. Obtain all necessary permits and provide traffic control measures around the project site per the approved traffic control plan.

B. Contractor is responsible for reviewing all survey, utility provider records, and COK records relative to the existing above and below grade site improvements and utilities. Contractor shall document existing conditions of improvements and utilities to remain per Drawings that include but are not limited to existing rockery and retaining wall, adjacent building and sidewalks, and utilities to remain.

C. Contractor is responsible for protecting existing improvements and utilities to remain onsite per Drawings and facilities adjacent to the project area from damage during construction. Restore damaged improvements to their original condition, as required by the owner of the improvement, at no additional cost to the Owner.

D. Contractor shall maintain uninterrupted utility services and vehicular and pedestrian access to adjacent properties and buildings.

E. Provide temporary protection measures as required and as indicated below:

1. Protect adjacent buildings and facilities from damage due to construction activities.

2. Protect existing site improvements and appurtenances to remain per Drawing.

3. Provide tree protection per Section 01 56 39 – Temporary Tree and Plant Protection.

4. Provide temporary barricades and other protection measures required to prevent injury to people and damage to adjacent buildings and facilities to remain.

5. Provide protection to ensure safe passage of people around demolition areas and to and from occupied portions of adjacent buildings and structures.

6. Provide temporary protection measures required to maintain and protect existing rockery and retaining wall along west and north property limits from damage. Contractor shall stop work if any damage occurs to the rockery and retaining wall and shall coordinate with Owner's Representative and Owner's geotechnical engineer to assess damages. Prior to re-commencing construction activities, Contractor shall coordinate with Owner's geotechnical engineer to provide additional protection measures and Owner approved mitigation for addressing damages to existing rockery and retaining wall.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

7. Provide and maintain dust and noise control measures to limit dust, noise, and dirt migration adjacent properties.

8. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

F. Existing public and private utilities in the right-of-way, shall be protected and/or relocated to maintain service at all times, unless otherwise noted in the Drawings. Provide access to the utilities as required by the providers of the utility

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work includes but is not limited to: Furnishing and installing storm drainage structures, pipes, and other appurtenances of the storm drainage system as shown on the Drawings.

1.2 RELATED SECTIONS

A. Coordinate and comply with the following sections:

1. 01 57 13 – Temporary Erosion and Sediment Control
2. 01 74 19 – Construction Waste Management and Disposal
3. 02 01 00 – Maintenance of Existing Conditions
4. 31 00 00 – Earthwork

1.3 REFERENCE STANDARDS

A. The City of Kirkland (COK) pre-approved plans and policies, January 1, 2020 edition.

B. The Northshore Utility District (NUD) Standard Specification and Details, February 2020

C. Washington Department of Transportation (WSDOT) Standard Specifications and Standard plans for Road, Bridge and Municipal Construction, 2020 edition.

D. The Standard Specifications apply only to the construction requirements and materials and how they are to be incorporated into the Work. If referenced standards conflict the more stringent specification shall apply. The legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

1.4 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 QUALITY ASSURANCE

A. Demolition of above and below grade site elements shall be per Drawings and be in accordance with COK requirements. All utility demolition, capping and/or abandonment shall be in accordance with utility provider standard specification and requirements that include but are not limited to NUD, COK, and power, gas, and communication utility providers.

1.6 COORDINATION

A. Traffic control plans for demolition operations shall be prepared and approved by the COK.

B. Coordinate demolition work adjacent to or associated with existing utilities with respective utility providers.

C. Adjacent property buildings will be occupied during demolition and construction activities. Coordinate with Owner's representative for any demolition activities that will affect operations of adjacent properties.

1.7 PROJECT CONDITIONS

A. Contractor shall protect existing improvements and utilities to remain in the vicinity of the project demolition and construction activities from damage and maintain access for the owners of the utilities at all times during construction. Any damage resulting from project demolition activities to existing improvements and utilities to remain shall be restored by the Contractor to their original condition or as required by the owner of the improvement, at no additional cost to the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Perform utility locates and potholing in areas of demolition prior to initiation of demolition and construction activities to verify existing conditions. The Contractor shall provide copies of the utility locate and potholing data results to the Owner's Representative.

B. Review existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.2 PREPARATION

A. Provide temporary barricades, construction pedestrian signage and other protection required to prevent injury to people and damage to adjacent facilities to remain.

B. Install temporary erosion control facilities and tree protection prior to commencing demolition operations, as indicated on the Drawings and Specification

C. Conduct demolition and debris removal operations to minimize interference with vehicular and pedestrian traffic, utility operations and other adjacent occupied facilities

3.3 GENERAL DEMOLTION REQUIREMENTS

A. Coordinate salvage operations with the Owner's Representative and utility providers.

B. Demolish and remove existing improvements within the onsite project limits only to the extent required by new construction and as indicated within the Limits of Work on the Drawings. Refer to WSDOT Standard Specifications Sections 2-02.

C. Make a vertical saw cut between existing paving, sidewalk, curbs and gutters to remain and the portion to be removed. Refer to WSDOT Standard Specifications Section 2-02.3(3)

D. Trenches, holes or pits that result from demolition activities shall be filled to existing grade with imported Trench Backfill per Section 31 00 00. All excavated material shall be properly disposed of offsite.

3.4 DISPOSAL

A. All asphalt and concrete debris generated by demolition activities shall be ground, hauled and disposed of legally off-site.

B. Any material not named as the Owner's property shall belong to the Contractor. Contractor shall dispose of such material legally off-site.

3.5 CLEANING

A. Clean adjacent pavement areas and public right-of-ways of dust, dirt, and debris caused by demolition operations. Return adjacent areas to existing condition, present before demolition operations began.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. SECTION INCLUDES

1. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.
2. Openings for other affected work.
3. Form accessories.
4. Stripping forms.

B. RELATED SECTIONS

1. Division 01 Section "Submittal Procedures" for submittal requirements.
2. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Section 03 20 00 – Concrete Reinforcing.
4. Section 03 30 00 – Cast-in-Place Concrete.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ACI 347 - Recommended Practice for Concrete Formwork.

D. APA PS 1 - Product Standard: Plywood Product Standard Handbook - for Construction and Industrial Plywood.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 DESIGN REQUIREMENTS

A. Design, engineer, and construct formwork, shoring, and bracing to meet design and code requirements, so that resultant concrete conforms to required shapes, lines, and dimensions.

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13

C. Manufacturer's Literature Submit manufacturer's literature describing form materials, accessories, and form release agents.

D. Contractor is responsible for the structural integrity of the formwork. Architect will review drawings for finished appearance of the concrete and for conformance with the design concepts only.

1.7 QUALITY ASSURANCE

A. Design, construct and erect concrete formwork in accordance with ACI 301, 318 and 347.

1.8 REGULATORY REQUIREMENTS

A. Conform to International Building Code - 2015.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver materials under provisions of Division 01.

B. Store above ground on framework or blocking in ventilated and protected area to prevent deterioration from moisture or damage.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Plywood Forms for Exposed Concrete: APA Plyform Class I and Class II. Use nonstaining oil guaranteed not to affect subsequent finish treatment. Well matched, tight fitting, of sufficient strength and stiffness to provide continuous, straight, smooth surfaces and to prevent leakage. Stiffen to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surface.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and 1 side for a tight fit.

C. Forms for Architectural Concrete Finishes or other exposed concrete:

1. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, of sufficient strength and stiffness to provide continuous, straight, smooth surfaces and to prevent leakage. Stiffen to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surface.
2. Steel: Minimum 16-gage sheet, well matched, tight fitting, of sufficient strength and stiffness to provide continuous, straight, smooth surfaces and to prevent leakage. Stiffen to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surface.

2.2 FORMWORK ACCESSORIES

A. Form Ties

1. Snap Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Burke, Superior or approved high-strength wire snap ties with flattened break-offs; break-backs and lengths as required for the conditions of the installation; noncorrosive and nonstaining finish.

a. Ties for Concrete Walls Below-Grade: Galvanized steel snap-ties with 1-inch diameter removable cones with break-back. Provide with water seals to inhibit the flow of water along the tie shaft and block against leakage. "Burke Penta-Tie" with water seal or approved equal.
b. Ties for Concrete Walls Above-Grade: Galvanized steel snap-ties with 1-inch diameter removable cones leaving no metal closer than 1-inch from finished concrete surface. Burke "Penta Tie" or approved equal.

B. Form Ties for Architectural Concrete finishes: Factory-fabricated, internally disconnecting or removable ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish ties with tapered tie cone spreaders that, when removed, will leave holes 3/4 inch in diameter on concrete surface.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Plugs: Provide precast concrete form tie hole plugs, that are recessed ¼-inch from face of wall surface; provide epoxy adhesive to retain plugs in holes.

   a. Plug Manufacturer: Burke or approved Equal.

C. Form Release Agent: Colorless material with a maximum of 350 mg/l volatile organic compounds (VOC) which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete, and will not impair subsequent treatments of concrete surfaces. Manufactured by Burke, Nox-Crete, Industrial Synthetics Corporation or approved equal.

D. Fillets for Chamfered Corners: Metal, rigid plastic, elastomeric rubber, or dressed wood, 3/4 by 3/4 inch, minimum or as indicated on drawings; nonstaining; in longest practicable lengths

E. Nails, Spikes, Lag Bolts, Through Bolts, and Anchorages: Sized, as required, of strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.1 GENERAL

A. Design, erect, support, brace and maintain formwork and existing structure used as supports or forms to support vertical, lateral, static, and dynamic loads that might be applied until the concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

1. Provide Class A (1/8-inch) tolerances for concrete surfaces exposed to view.
2. Provide Class C tolerances for other concrete surfaces.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required in the Work.

3.2 INSPECTION

A. Verify lines, levels, and measurements before proceeding with formwork.

3.3 PREPARATION

A. Inspect all contact surfaces prior to concrete placement. Verify that surfaces are clean, smooth and free from foreign matter or imperfections affecting appearance of finished concrete. Hand-trim sides and bottoms of earth forms; remove loose dirt prior to placing concrete.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.

C. Arrange and assemble formwork to permit dismantling or stripping, so that concrete is not damaged during its removal.

D. Arrange forms to allow stripping without removal of principal shores, where required to remain in place.

E. Arrange shoring and bracing to transmit loads from successive parts of structure directly through falsework to proper support.

F. Before erection of forming, plug and seal all cracks, holes, slits, gaps and other "telegraphing" imperfections in contact surfaces.

3.4 ERECTION

A. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.

B. Camber: Erect formwork for anticipated deflections due to weight and pressure of fresh concrete and for structural cambers as noted on the drawings. Provide positive means for adjustment of shores and struts to compensate for settlement during placement.

C. Provide temporary openings in formwork to facilitate cleaning and inspection where interior area of formwork is inaccessible before and during concrete placement. Locate openings at bottom of forms to allow flushing water to drain. Locate temporary openings in forms at inconspicuous locations. Close openings with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces. Securely brace temporary openings and set tightly to prevent losing concrete mortar.

D. Provide chamfer strips on external corners of beams, joists, columns, walls and other members.

E. Do not displace or damage vapor barrier placed by Section 03 30 00.

F. Construct formwork to maintain tolerances in accordance with ACI 301.

3.5 APPLICATION OF FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Do not apply form release agent where concrete surfaces are scheduled to receive special finishes or applied coverings which may be affected by agent. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete. Refer to Section 03 3000.

C. Do not apply form release agent where wood graining characteristics are required on finished concrete surfaces. Leave formwork dry. Refer to Section 03 30 00.

3.6 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for work embedded in or passing through concrete.

B. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

C. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

3.7 CLEANING

A. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

B. Ensure that water and debris drain to exterior through clean-out openings.

C. During cold weather, remove ice and snow from forms. Do not use de-icing salts. Do not use water to clean out completed forms, unless formwork and construction proceed within heated enclosure. Use compressed air to remove foreign matter.

3.8 FORM REMOVAL

A. Do not remove forms and shoring until concrete has sufficient strength to support its own weight, and construction and design loads which may be imposed upon it.

B. Formwork for columns, walls, and other parts not supporting the weight of the concrete may be removed in a minimum of 3 days after placement of concrete, and as soon as the concrete has hardened sufficiently to resist damage from removal operations.

C. Remove formwork progressively so no unbalanced loads are imposed on structure.

D. Do not damage concrete surfaces during form removal.

E. Store reusable forms for exposed architectural concrete to prevent damage to contact surfaces.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. At concrete surfaces to remain exposed in finished structure remove formwork in same sequence as concrete placement to achieve similar concrete surface coloration.

3.9 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Reinforcing steel bars and accessories for cast-in-place concrete.

B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submittal requirements.
2. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Section 03 10 00 - Concrete Forming and Accessories.
4. Section 03 30 00 - Cast-in-Place Concrete.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 Building Code Requirements for Reinforced Concrete.

C. ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures.

D. ASTM A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

1.5 SUBMITTALS

A. Comply with requirements of Section 01 33 00.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data for Credit MR 3: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content data.
    a. Include statement indicating costs for each product having recycled content.

C. Shop Drawings: Indicate bar sizes, spacing, steel grades, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.

D. Test reports and material certificates.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 318.

B. Allowable Tolerances

1. Fabrication Tolerances: Conform to Figure 4, ACI 315.

C. Placement Tolerances:

1. Position, secure, and support reinforcing steel within the following tolerances:
2. Concrete cover to finish formed surface, +/- 1/4 inch.
3. Minimum spacing between bars, +/- 1/4 inch.
4. Top bars in slabs, members 8 inches deep or less, +/- 1/4 inch.
5. Space reinforcing steel crosswise in members evenly within two inches.
6. If reinforcing bars are displaced, or if it is necessary to move bars to avoid interference with other reinforcing or embedded items, and if bars are moved to exceed tolerances, obtain approval from Engineer of resulting arrangement prior to placing concrete.

D. Reinforcing Support: Take particular care in placing chairs or supports for reinforcing so that there will be no steel exposed.

E. Inspection: The Owner shall contract and pay for special inspectors to observe placement and welding of reinforcing in concrete.

F. No heating of reinforcement will be permitted. No bending of reinforcement after partial embedment in concrete will be permitted, unless otherwise noted or approved.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: See Structural Notes in drawings.

2.2 ACCESSORIES

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions complying with CRSI specifications, including load bearing pad on bottom to prevent vapor barrier puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: size and shape as required.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI 318 and ACI 315.

B. Locate reinforcing splices not indicated on drawings, in accordance with ACI 318, Chapter 7. Review location of splices with Architect/Engineer.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing per structural notes.

E. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Reinforce all blockouts and sleeves that are required for mechanical and electrical systems with (2) No. 5 bars on four sides of the opening, unless otherwise noted in the drawings. Extend bars 2'-0" minimum past edges of opening or provide hooks.

G. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.2 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspection and testing of reinforcing steel in place.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The interior slab will be substantially an exposed, polished concrete slab. These specifications outline and stress the importance of a high-quality slab finish and protection.

B. This Section specifies cast-in place concrete, including but not limited to, concrete materials, mixture design, placement procedures, and finishes, for but not limited to, the following:

1. Foundations.
2. Foundation walls.
3. Slabs-on-grade.
4. Fence/Gate posts
5. Equipment Pads
6. Flagpole base
7. Concrete Site walls
8. Sidewalk ramp and steps
9. Water stops
10. Vapor retarders installed below slab-on-grade.
11. Floor Protection
12. Concrete repairs.
13. Broadcast aggregate seeding for concrete slabs with seeded aggregate for decorative polished concrete finish
14. Concrete curing

C. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submittal requirements.
2. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. 03 10 00 Concrete Forming and Accessories.
4. 03 20 00 – Concrete Reinforcing.
5. 03 35 43 – “Polished Concrete Finishing” for densifiers, hardeners, applied coatings, polishing finish, and sealants for saw cut joints in polished concrete slabs
6. Section 07 19 00 – “Water Repellants” application of water repellants at exterior slabs.
7. Section 07 92 00 – “Joint Sealers” Sealants for saw cut joints and isolation joints in slabs.
8. Division 31 Section "Earthwork" for drainage fill under slabs-on-grade.
9. Division 32 Section "Concrete Paving" for exterior concrete work not specified in this section and pervious paving.
10. Division 33 “Subdrainage” for perimeter drainage system.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Comply with requirements of Section 01 33 00.

B. Product Data:

1. Curing compound
2. Admixtures proposed for use, including shrinkage-reducing admixtures, air-entraining admixtures, and water-reducing admixtures.
3. Vapor retarders
4. Other proprietary products

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Manufacturer data to demonstrate responsible sourcing of raw materials for Credit MRc3: Sourcing of Raw Materials.
3. Product data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
    a. Include statement indicating costs for each product having recycled content.
4. Product Data for Credit IEQc4.
5. Concrete Mix design for Exterior Paving: Must demonstrate meeting a solar reflectance value equal to or greater than SR 0.33 for unshaded hardscape to achieve SSc4 Heat Island Reduction- Nonroof.

D. Finish Product Data:

1. Material Safety Data Sheets
2. Slab protection procedure outline
3. Joint filling, crack repair and or surface repair products and protocols
4. Maintenance Data: provide data on maintenance renewal of applied coatings.

E. Samples:

1. Verification Samples: Submit sample chips of specified colors indicating pigment numbers and required dosage rates, for subsequent comparison to installed concrete.
2. Verification Samples: Submit sample chips of selected recycled mirror aggregate colors for subsequent comparison to installed concrete.

F. Shop Drawings:

1. Provide plan view of the floor and joints clearly marked for the work and the sealer.
    a. Show proposed types and locations of all concrete joints including those not shown on the drawings. Obtain Architect's approval of construction and control joint locations prior to placing concrete.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Provide identification of joints with clarification as to those that are construction joints, control joints and expansion joints.
c. Indicate typical layout including dimensions and floor grinding schedule

2. Provide slab plan showing all elevations. Slab plan to show elevation changes, slope direction and dimensions.
3. See Section 03 10 00 Concrete Forming and Accessories for formwork shop drawings

G. Cement Certification: Submit written certification from cement manufacturer stating that cement meets requirement specified. Include mill test reports.

1. Mix Designs: Submit proposed mix designs, including results of trial mix testing at least 15 days in advance of placing operations for each type of concrete specified stating the following:

a. Method used to determine proposed mix design.
b. Gradation of fine and coarse aggregates.
c. Proportions of all ingredients, including all admixtures added either at time of batching or at job site. Aggregate weights shall be based upon saturated surface dry conditions.
d. Water/cement ratio.
e. Slump, ASTM C143.
f. Air content of freshly mixed concrete, ASTM C231.
g. Strength measured at 7 and 28 days. Strengths shall be as tested using ACI standard 6" x 12" cylinders.
h. Shrinkage limitations at 28 days, ASTM C157
i. Locations or intended use of each mix design.

2. Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

H. Curing Compound Certification: Submit written certification for Architects approval, that curing compound is compatible with subsequent material which is to be applied over concrete substrate. This certification is required from the manufacturers of materials which are to be applied over concrete. Approval from said manufacturers must be obtained prior to casting concrete.

I. Submit Floor Flatness (FF) and Floor Levelness (FL) measurements report, indicating compliance with specified tolerances no later than 48 hours following final building slab pour

J. Valid and Current Installer Certifications and References

K. Quality Control Submittals: Provide setting diagrams, templates, instructions and directions as required for installation.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Comply with applicable provisions except as otherwise indicated.

1. ACI 301 - Specifications for Structural Concrete Buildings.
2. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).
3. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete.
4. ACI 318 - Building Code Requirements for Reinforced Concrete.
5. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. Comply with provisions of air-pollution regulations of authorities having jurisdiction.
7. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008).
8. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

B. Concrete Testing Services: Owner shall employ an acceptable testing laboratory to perform materials evaluation, design and testing of concrete mixes. Refer to Part 3 of this Section.

1. Testing Agency Qualifications: An independent testing agency, acceptable to owner, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

C. Installer Qualifications: A qualified installer who employs on a project personnel qualified as ACI-certified flatwork technician and finisher and a supervisor who is an ACI-certified concrete flatwork technician. Must have a minimum of 5 years of actual experience, and a minimum 15 projects of same size and scope.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

   a. Contractor's superintendent
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete subcontractor.
   e. Concrete Polishing Subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

F. Intent of this specification is for installation of a product without cracks, joint spalling and other surface imperfections. It is the contractor's responsibility to protect the slab from damage after the pour.

1. If the concrete at **exposed slabs** does experience cracks, joint spalling or other surface imperfections, as identified by the owner and architect, the contractor shall repair the concrete as approved by the architect and owner or replace the slab at no additional cost to the owner.
2. If concrete at slabs **schedule to receive floor coverings** experience cracks, joint spalling or other imperfection, contractor shall repair concrete per as approved by the architect and owner at no additional cost to the owner.
3. Architect reserves the right to reject concrete installations not incompliance with these specifications without repairs.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. If required for concrete repair - materials and methods information shall be submitted for review and approval.

G. Mock-up of Exposed Slabs:

1. Coordinate with requirements of Section 03 35 43 “Polished Concrete Finishing”.
2. Provide (3) 10’ x 10’ minimum sample mock ups of level of seeding and color for acceptance by architect.
3. Mock-ups shall stay in place until owner and architect acceptance of slab finish.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver anchorage items to be embedded in concrete for other construction before start of such work.

B. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.7 WARRANTY

A. Comply with provisions of 017836 and 017700.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Sustainable design for regional materials (concrete).

B. Portland Cement: ASTM C 150, Type I or III.

C. Fly Ash: ASTM C 618, Type C or F. 15% fly ash at exposed slabs or walls, 35% fly ash at all other locations.

D. Normal-Weight Aggregates: ASTM C 33, except local aggregates of proven durability may be used when acceptable to Architect. Provide aggregates from single source for exposed concrete.

E. Fine and Coarse Aggregates: ASTM C 33.

F. Water: ASTM C 94/C 94M and potable.

G. Admixture: See Section 2.3.

H. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

I. Color Additives at Decorative Polished Concrete Locations: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979.

1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
2. Products:

a. Davis Colors: www.daviscolors.com.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. L.M. Scofield Company, Chromix.
c. BASF; MasterColor (Rheocolor L)
d. Or approved equal.

3. Color: Manufacturer's full range.

J. Recycled Mirror Aggregate: 100% Post consumer recycled product, as re-manufactured by American Specialty Glass.

1. Manufacturers:

a. American Specialty Glass: www.americanspecialtyglass.com.
b. Or approved equal.

2. Size: #1 graded 1/8 inch to 1/4 inch.

K. Seeded Rock Aggregate: Round aggregate.

1. Size: 3/8 inch minus.
2. Seeding concentration: 95% to full surface coverage.

2.2 RELATED MATERIALS

A. Bonding Agent: Polyvinyl acetate or acrylic base. Larsen Weld-Crete, or Meadows Intralok, or Burke Acrylic Bondcrete.

B. Epoxy Adhesive: Per structural drawings.

C. Pre-molded fillers:

1. Interior Slabs: Provide rigid foamed urethane, polyvinyl, or polyethylene premolded joint filler per section 07 92 00
2. Exterior Slab: Provide Asphaltic filler per Sections 07 92 00 and 32 32 13

D. Joint Sealers: Provide per Section 07 92 00 unless indicated otherwise.

1. Interior Exposed Polished Slab: as approved by polished floor system manufacturer. Refer to section 03 35 43 "Polished Concrete Finishing".

2.3 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260

B. Water-Reducing Admixture: ASTM C 494, Type F. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability. Use admixtures which have been tested and accepted in mix designs.

C. Accelerating Admixture: ASTM C 494, Type E. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).

D. Shrinkage-Reducing Admixture: Eclipse Floor 200 (by Grace Concrete Products), Masterlife SRA 20 (by BASF) or equivalent proportioned in accordance with manufacturer's specifications to meet required maximum drying shrinkage requirements listed below.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Dosage: For bidding purposes only, assume 1.5 gallon of admixture per cubic yard of concrete for all exposed slabs. Final optimum dosage and mix design shall be determined by the concrete supplier/manufacturer based on testing prior to construction.
2. Admixture volume shall replace equal volume water.
3. Water-reducing admixtures: Use only near neutral setting polycarboxylate-based water-reducing admixtures that are compatible with shrinkage-reducing admixtures listed above.
4. Site-mixing of a admixtures not allowed.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

F. Do not use chemicals that will result in soluble chloride ions in excess of 0.05 percent by weight of cement.

2.4 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of cast-in-place concrete proportioned on basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed design mixtures based on laboratory trial mixtures.

B. Exposed Slabs: Concrete mixes for slabs exposed upon final completion.

1. Water-Cement Ratio: Per General Structural Notes.
2. Maximum water content of 270 lbs/cubic yard.
3. Strength: Per General Structural Notes
4. Aggregate: Gradation well proportioned and distributed with largest top size coarse aggregate of 1 inch. Coarse aggregate shall include 3/8" aggregate. Coarse to fine aggregate ratio shall be between 1.5:1 and 2:1.
5. Fly Ash or Slag: Maximum 15%
6. Admixtures: See approved admixtures in section above. Shrinkage reducing admixture shall be used at all exposed slabs.
7. Maximum slump 5" +/- 1" (with water reducing admixtures included)
8. The mix shall provide for a maximum curing shrinkage of 0.0003 inches per inche.

C. Proportion concrete mixtures as follows:

1. Compressive Strength (28 Days): Refer to Drawings, "General Structural Notes".
2. Maximum Water-Cementitious Materials Ratio: Refer to Drawings, "General Structural Notes".

D. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.5 READY-MIX CONCRETE

A. Comply with requirements of ASTM C 94.

B. Utilize ready-mix concrete wherever locally available, subject to plant approval.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Ensure that fully executed and signed trip tickets accompany each load. Inspector shall log in the trip tickets at the job site at time of entry.

D. Retempering of concrete that has taken its initial set is not allowed.

E. Adding of mix water without authorization is not allowed.

2.6 WATERSTOPS

A. Provide the type of waterstop as indicated on the Drawings.

B. Self-Expanding Butyl Strip Waterstops:

1. Preformed waterstop, flexible strip of bentonite waterproofing compound in cartridge or coil form; designed specifically for vertical and horizontal joints in concrete construction.
2. Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
3. Available Products:

a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
b. Or approved Equal.

2.7 VAPOR RETARDERS

A. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E154, as follows:

1. Thickness: Not less than 15-mils thick at all areas.
2. Permeance rating of not greater than .01 perms per ASTM F 1249.

a. Stated product literature for permeance must verified by Clemson University Vapor Barrier Permeance Study or comparable.

B. Basis of Design: Provide Stego Wrap 15, Stego Industries, LLC, ASTM E 1745, Class A..

1. Available Products subject to compliance with requirements:

a. Stego Industries, LLC; Stego Wrap, 15 mils.
b. Fortifiber Corporation; Moistop Ultra 15.
c. Raven Industries Inc.; Vapor Block 15.
d. Or approved equal.

C. Accessories: Provide manufacturer's recommended adhesive and pressure-sensitive tape, vapor proofing mastic adhesive and pipe boots.

2.8 FLOOR AND SLAB TREATMENTS

A. Exposed Polished Concrete Slab: Refer to Section 03 35 43 “Polished Concrete Finishing”

2.9 CURING MATERIALS

A. Where allowed, Provide Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound compatible with concrete sealer complying with ASTM C 309, Type I, Class A (non-yellowing). Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    a. Basis of Design L&M Cure, L&M Construction Chemicals, Inc.
    b. Or Approved Equal.

2.10 FLUID APPLIED MOISTURE BARRIER (allowance)

A. As required at floor areas receiving floor coverings (with Owner's authorization), where existing moisture levels do not meet floor covering manufacturer's requirements.

B. Basis of Design: Provide a high performance, epoxy moisture barrier, Planiseal EMB, by MAPEI or approved equal subject to compliance with requirements.

C. To be provided as a moisture remediation measure to existing concrete floors as required by finish flooring manufacturer's recommendations for moisture levels. Refer to specific sections for finish flooring requirements.

2.11 FLOOR PROTECTION

A. Basis of Design: Provide HT Commercial System by Skudo or other comparable products subject to compliance with requirements.
    1. Or approved equal

PART 3 - EXECUTION

3.1 VAPOR RETARDERS

A. Plastic Vapor Retarders – Slab-on-grade: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
    1. Ensure Geotechnical Engineer pre-approve base course placement prior to placing vapor retarder.
    2. Level and tamp or roll aggregate base course.
    3. Install vapor retarder directly under concrete slab and over aggregate base course.
    4. Place, protect, and repair vapor-retarder barrier sheeting in position with longest dimension parallel with direction of pour.
    5. Lap joints, including repairs, min. 6" and seal with manufacturer's recommended mastic or pressure-sensitive tape.
    6. Seal all penetrations, including pipes and stem walls per manufacturer's instructions. Use vapor retarder sheet to boot around all penetrations and seal with mastic or tape to create a continuous vapor retarder.
    7. No penetration of vapor retarder is allowed unless properly sealed per manufacturer's instructions. Do not penetrate vapor retarder with screed pins, wood stakes or other items.

3.2 INSTALLATION - CONCRETE

A. Coordinate installation of joint materials and other related materials with placement of forms and reinforcing steel.

B. Formwork per Section 03 10 00 and as indicated below:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Design, erect, shore, brace, and maintain formwork, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
2. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position.
3. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

    a. Class A, 1/8 inch

4. Construct forms tight enough to prevent loss of concrete mortar.
5. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

    a. Do not use rust-stained steel form-facing material.

6. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
7. Chamfer exterior corners and edges of permanently exposed concrete.
8. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
9. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
10. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
11. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

C. REMOVING AND REUSING FORMS

1. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

D. Waterstops - Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

E. Concrete Placement:

1. Provide appropriate number of skilled labor and craftsmen to complete all work scheduled to be performed in a single day to the specified tolerance levels.
2. Comply with ACI, placing concrete in a continuous operation within planned joints or sections.
3. Do not begin placement until work of other trades affecting concrete is completed.
4. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into forms.
5. Concrete Thickness: As indicated on Structural Drawings.
6. Concrete Slabs for Decorative Polished Finish: Place decorative concrete slabs where scheduled to receive Decorative Polished Concrete (DPC) finish.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Comply with recommendations in ACI 302.1R.
b. Protect concrete surfaces scheduled to receive polished finish prior to finishing; prevent damage and staining.
c. At the proper time point when placing slabs, hand seed recycled glass aggregate at the rate of 1 ounce per square foot, in accordance with manufacturer's recommendations.
d. Coordinate work application of seeded glass aggregate with work in Section 03 35 43 "Polished Concrete Finishing".
e. See Section 03 35 43 "Polished Concrete Finishing" for additional requirements related to the application of seeded glass aggregate.
f. The intent of this process to create a finished floor where the surface reveals 3/8 inch aggregate evenly spaced 1/8 inch to 3/8 inch apart, with recycled mirror spaced at 4 inches to 8 inches apart.

F. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.

1. Cold Weather: Comply with ACI 306.
2. Hot Weather: Comply with ACI 305.

3.3 FINISHING FLOORS AND SLABS

A. General:

1. INFORM ALL TRADES THAT SLAB IS TO BE PROTECTED AT ALL TIMES
2. Physically protect slabs as described in Part 3 of these specifications, from all construction relate work to prevent chips, dings, cracks, or other damage **AT ALL TIMES.**
3. Allow **NO** standing water on slab
4. Protect from petroleum and other chemical stains during construction
5. Diaper all hydraulic powered equipment
6. Do not park vehicles on inside slab
7. **NO** pipe cutting machines are to be used on inside floor slab.
8. **DO NOT** place reinforcing steel or any other steel on interior slabs to avoid rust stains.
9. Pick up all nails and other fasteners immediately to keep the floors clean and free of rust staining.
10. **DO NOT** use acids or acidic detergents on slab.
11. In areas with floor drains, where slope is indicated, maintain floor level at walls and pitch surfaces uniformly to drains.

B. Interior Slabs:

1. Trowel Finish: Provide hard troweled finish on slab with three (3) trowel passes

a. After floating, begin first trowel-finish operation using a power-driven trowel.
b. Begin final troweling when surface produces a ringing sound as trowel is moved over surface.

1) Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to minimum overall value of F(F) 50 (floor flatness) and F(L) 35 (floor levelness) and minimum localized level of F(F) 35 (floor flatness) and F(L) 20 (floor levelness measured according to ASTM E 1155.

c. Provide floor flatness and levelness testing promptly after troweling and prior to saw cutting slab and no more than 8 hours after pour.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Grind smooth any surface defects that would telegraph through applied floor covering system.
3. Refer Section 03 35 43 "Polished Concrete Finishing", for Interior Polished Slab treatment.
4. Install specified protection board as soon as slab has reached it's 28 day cure.
    a. Reinstall protection board after polishing activites per 03 35 43.

3.4 EXTERIOR SLAB FINISHES

A. Finish horizontal concrete paved/walk surfaces in accordance with ACI 301; provide 1/2-inch radiused corner at edges of slabs. Refer to Division 32 "Concrete Paving" for additional requirements

1. Apply a non-slip "light broom finish" to exterior concrete surfaces, including sidewalks, platforms, steps, ramps, pads, all entry and patio slabs and elsewhere as indicated
2. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect in mock-up sample panels before application.
3. Tool control joints with 1/8-inch radius edge.

3.5 CONCRETE VERTICAL WALLS

A. Vertical Concrete building and site walls: (Refer to Division 32 "Concrete Paving" for additional requirements)

1. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view, or a covering material applied directly to concrete, such as waterproofing, damp proofing, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
2. Architectural Concrete Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view. The exposed surfaces identified on drawings, shall be polished to a 1200 grit polish by removing minimal surface material producing a cream to light aggregate exposure. The remainder exposed surface shall be as-cast concrete surface obtained with selected smooth form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
3. Concrete sealer: Refer to Section 07 1900 "Water Repellents"
    a. Provide clear penetrating water repellent to all exposed vertical wall surfaces per manufactures written instructions and guidelines.

3.6 CONCRETE JOINTS

A. Contractor to submit Joint Layout Plan prior to proceeding with the work.

B. Apply joint sealant as soon as concrete will allow proper adhesion unless noted otherwise.

C. Interior Expansion Joints: In accordance with ACI 301, Paragraph 6.2 and as follows:

1. Unless otherwise indicated, Provide rigid foamed urethane, polyvinyl, or polyethylene premolded joint filler, 1/2 inch thick, width as required to bring top to within 1 inch of slab surface.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Clean joint per manufacturer's recommendations.
3. Remainder of joint filled with sealant, specified in this section and as required in Section 07 9200.

D. Isolation Joints in horizontal Slabs: Construct expansion joints in horizontal slabs at points of contact between horizontal slabs and vertical surfaces, such as column pedestals and elsewhere as required.

1. Provide rigid foamed urethane, polyvinyl, or polyethylene premolded joint filler, 1/2 inch thick, width as required to bring top to within 1 inch of slab surface.
2. Clean joint per manufacturer's recommendations.
3. Remainder of joint filled with sealant, specified in Section 07 9200.

E. Exterior Expansion Joints: Install Asphaltic joint material conforming with requirements of ASTM D994;

1. 1/2-inch wide by 1/2-inch less than slab depth;
2. tool edges of concrete at joint smooth;
3. finish with urethane sealant specified in Section 07 9200.
4. Form joints in straight lines and accurate locations wherever exterior slabs abut vertical surfaces at intersections of new concrete with existing concrete, not more than 15 feet apart in walks, not more than 30 feet apart in curbs, and elsewhere as indicated on drawings.

F. Cold Joints: Form to detail and cast surrounding areas; after concrete of surrounding areas has set and hardened, remove forms and coat surfaces of joint with bond breaker and cast remainder of surface.

G. Contraction/Control Joints in Slabs-on-Grade: Form weakened-plane Contraction/Control joints, sectioning concrete into square pattern spaced at 15 feet o.c. maximum and to pattern as indicated on drawings. Provide joint layout drawings for Architect's approval showing joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays). Construct Contraction/Control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form Contraction/Control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of Contraction/Control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form Contraction/Control joints with early entry "soff-cut" power saws equipped with a **NEW** early entry "soff-cut" shatterproof abrasive diamond-rimmed blades and new raveling protection plate. Cut 1/8-inch (3.2 mm) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

    a. Schedule concrete pours to allow for same day saw cutting.
    b. Saw joints as soon as Testing Lab has completed taking the slab flatness and levelness readings, and as soon as the slab will support the weight of the saw and operator without disturbing the final finish. Normally 2 hours maximum after final finishing or 150 psi but not more than 4 hours after final finishing unless approved by architect and engineer.
    c. Sawed joints shall extend fully to wall, vertical surface, intersecting joint without overlapping unless specifically identified to continue through intersecting joint.
    d. Clean joints as required by joint sealer manufacturer and fill with backer rod and sealant, specified in Section 07 92 00.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1) All Interior Contraction/Contol joints, Seal with semi-rigid sealant as specified in section 03 35 43.

3.7 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

1. Mix, place and cure concrete as specified to blend with in-place construction.
2. Provide other miscellaneous concrete filling shown or required to complete the Work.

3.8 CURING

A. Begin initial curing as soon as free water has disappeared from exposed surfaces.

B. Keep concrete continuously moist for not less than 7 days.

C. Curing Methods: Moisture Curing Concrete Slabs:

1. No sealers, curing agents or other fluid applied coatings shall be applied to concrete slabs that are to be covered by carpet or resilient flooring unless approved by flooring manufacturer.
2. Moisture cure for 7 days using a waterproof sheet curing paper, blanket, or sheeting methods (see ACI 302.1R and ACI 308) that prevents evaporation and maintains equalized moisture content through slab thickness.
3. Apply an evaporation-control compound to all slabs to be exposed in their final condition.
4. It is the contractor's responsibility to ensure that curing procedures avoid slab curl. The Contractor shall use all means necessary to avoid slab curling beyond slab levelness tolerances specified elsewhere herein. Such means include but are not limited to (1) use of an anti-curl mix, (2) avoidance of high-early strength concrete, (3) use of maximum practical aggregate size, (4) avoidance of high range water reducers, (5) protect top surface from too-cold or too-warm temperatures.

D. Continue curing by use of moisture-retaining cover or membrane-forming curing compound (where allowed).

E. Cure formed surfaces by moist curing until forms are removed.

F. Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying appropriate wet curing method. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

G. Concrete slabs that are to receive adhesive secured floor coverings shall be based on mix designs, employ placement scheduling, follow placement procedures and be cured in a manner to achieve moisture content levels consistent with floor covering manufacturer's requirements for installation. If moisture levels in the slab exceed those recommended by resilient flooring manufacturer at the time scheduled for flooring installation, adjust schedule to preserved Contract Substantial Completion date and take steps necessary to allow installation of flooring including but not limited to dehumidification of spaces, sealers and toppings acceptable to flooring manufacturer and Architect or other measures as required to meet flooring manufacturer's recommendation for flooring installation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.9 FLUID APPLIED MOISTURE BARRIER

A. Concrete Slabs Receiving Floor Covering System.

1. No sealers, curing agents or other fluid applied coatings shall be applied to concrete slabs that are to be covered by carpet or resilient flooring.
2. Install moisture barrier to concrete floors on grade only if required to meet moisture floor finish specifications for applied floor coverings.
3. Perform Testing by special inspector to verify concrete substrate moisture emissions, relative humidity moisture content, and PH. Verify results as in conformance to flooring warranty provisions of finish flooring manufacturer.
4. Prepare floor surfaces and install per manufacturer's recommendations.
    a. Verify compatibility with flooring adhesives.

3.10 PROTECTION

A. General: Provide protections as required to prevent damage to exposed concrete surfaces.

1. Inform all trades that the slab is to be protected at all times.

B. Exposed Concrete Finished Slab Protection:

1. Physically protect slab from all construction related work to prevent any vehicle fluid spills, chips, dings, cracks or other damage at all times.
    a. Slab protection must allow for vapor transmission during continued slab curing and block spills, and other staining materials.
    b. After initial review by architect and owner and 28 days of cure, provide specified protection material throughout, over entire slab specified with an exposed finish and keep in place until substantial completion punchlist walk through. Install Floor Protection material per manufacturer's installation requirements.
    c. Where work is being performed above slab, provide additional impact protective cover (plywood or other approved product) over slab.
2. Allow no standing water on concrete slab
3. Protect from all petroleum stains during construction
4. Diaper all hydraulic powered equipment
5. Do not park vehicles on inside of slab
6. No pipe cutting machines to be used on inside floor slab
7. Do not place reinforcing steel or any other steel on interior slab, to avoid rust stains
8. Do not use acids or acidic detergents on slab
9. Pick up all nails and other fasteners immediately to keep the floors clean and free of rust staining, chipping and other related damage at all times.

3.11 DEFECTIVE CONCRETE SURFACE REPAIRS

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycomb, rock pockets, voids over 6 mm (1/4 inch) in any dimension, and holes left by tie rods and bolts, down to solid concrete, but in no case to depth of less than 25 mm (1 inch).

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Make edges of cuts perpendicular to concrete surface.
3. Thoroughly clean, dampen with water, and brush-coat area to be patched with specified bonding agent.
4. Place patching mortar after bonding agent has dried.

C. For vertical surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

D. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

E. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

F. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope. (Unless noted otherwise)

G. Patching Defective Areas at slabs scheduled to receive a floor covering: Repair and patch defective areas with approved repair material immediately after removal of forms when acceptable by Architect.

H. The contractor shall protect the exposed slab during the course of construction to prevent stains, discoloration, blemishes and general damage as necessary.

I. Patching and Repairing Defective areas at interior exposed slabs without floor coverings: Surface defects include crazing and cracks, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions

1. Refer to section 03 35 43 "Polished Concrete Finishing"
2. Defective slabs that cannot be repaired to Architects' satisfaction will be removed in it's entirety and replaced to meet specified tolerances at the contractor's expense.

    a. Contractor shall assume all costs associated with retesting as a result of defective concrete.

J. Correct low areas in unformed surfaces not intended to be an exposed finish AND approved by Architect, during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.

1. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Patch shall be from joint to joint

2. Only after approval of mock-up, repair isolated random cracks and single holes 1 inch or less in diameter with proprietary mix designed to match concrete in color and texture. Place and finish to match adjacent concrete per manufacturer's requirements. Keep patched area continuously moist for at least 72 hours.

K. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

L. Repair methods not specified above may be used, subject to acceptance of Architect.

M. Floors that do not meet Specified FF and FL value will be removed as required and repoured at the contractor's expense.

3.12 FIELD QUALITY CONTROL

A. Refer to the General Structural Notes.

B. Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. The testing laboratory will perform sampling, testing and inspections for quality control during concrete placement.

D. Sampling and Testing of Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
3. Concrete Temperature: Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C) and above; and each time a set of compression test specimens made.
4. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compression strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
5. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cubic yards plus additional sets for each 150 cubic yards over and above the first 25 cubic yards of each concrete class placed in any one day; one specimen tested at seven days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
6. When frequency of testing will provide less than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
7. When total quantity of a given class of concrete is less than 50 cubic yards, Architect may waive strength test if adequate evidence of satisfactory strength is provided.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

9. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

E. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.
8. See General Structural Notes for additional requirements
9. Measure floor and slab flatness and levelness according to ASTM E 1155 within 4 hours of finishing.
10. Perform testing to verify concrete substrate moisture emissions, relative humidity moisture content, and PH where floor covering is to be applied.

F. Concrete Slabs Receiving Carpet or Resilient Flooring Systems:

1. No sealers, curing agents or other fluid applied coatings shall be applied to concrete slabs that are to be covered by carpet or resilient flooring unless approved by flooring manufacturer.
2. Verify moisture emission and PH test results as in conformance to flooring warranty provisions of finish flooring manufacturers.-
3. Concrete Slab Moisture Criteria: Verify all values meet finish flooring manufacturers flooring warranty provisions.
    a. Relative Humidity: Maximum 85% unless noted otherwise by warranty provisions of finish flooring manufacturer.
    b. Percent Relative Humidity within Concrete Floor Slabs: Test to ASTM F2170.
    c. Concrete Moisture Testing: Verify results in conformance to flooring warranty provisions of finish flooring manufacturers.
    d. Alkalinity of Concrete Substrate: Test to ASTM F710. - Verify concrete alkalinity testing results are in conformance with flooring warranty provisions of finish flooring manufacturers.
4. Take all necessary measures to adjust concrete slab moisture and alkalinity to levels acceptable according to the installation recommendations and warranty provisions of finish flooring manufacturer. All such measures shall be at no additional cost to the Owner.

G. Test results shall be reported in writing to Architect, Structural Engineer, concrete manufacturer, and Contractor within 24 hours of testing unless otherwise noted. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

H. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

l. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
2. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes mechanically processed polished concrete finishing applied to cast-in-place concrete surfaces, as follows:

1. Sealed and Polished Concrete Finish.
2. Grout Filler for repairing minor defects in polished concrete floors
3. Concrete Repair (If allowed): Ppolishable wear topping, with exposed aggregate for polished concrete floor finish
4. Contraction/Control and Construction joint Sealant for interior Exposed Polished Slab

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 3 Section "Cast-in-Place Concrete" for interior concrete materials, concrete mixes, placement procedures, testing, protection and finishes not described in this section
3. Division 7 Section "Joint Sealants" for contraction and expansion joint sealants not defined in this section.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections

B. Submit product data for products listed, including concrete hardener and sealer, including information on compatibility of different products and limitations

1. Preparation and concrete grinding procedures

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Number of applications of the Flat Grind Seal hardener plus liquid.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data for Credit EIQ4.2 and MR5.

D. Provide Letter of certification from the National Floor Safety Institute (NFSI) confirming the floor finish system has been tested and passed phase Two Level of certification for "High-Traction" when tested by Method 101-A. ANSI B-101.1 & B101.3. or Equal Certification

E. Concrete Finisher's Certificates.

F. Provide sample of manufacturer's standard warranty to be included in final closeout documents.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has specialized in concrete special finishes similar in material, design and extent to that indicated for this Project and with a record of successful in-service performance.

1. Installer must be trained and holding current certification for installation of floor system.

B. Regulatory Requirements:

1. Comply with provisions of air-pollution regulations of authorities having jurisdiction.
2. Finish polished concrete in accordance with Concrete Polishing Association of America (CPAA), Class C, Level 3
3. Slip Resistance: Passing National Floor Safety Institute (NFSI) phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 & B101.3 for "High Traction". And meeting minimum standards of Wet SCOF value of 0.60 or greater and a Wet DCOF value of 0.42 or greater

a. After polishing, provide testing to confirm system minimum slip resistance of Wet SCOF value of 0.60 or greater and a Wet DCOF value of 0.42 or greater

C. Mockups: Prior to applying special concrete finishes, construct mockups for each finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects. Apply mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate mockups in a room location as approved by Architect.

a. Mockups may be incorporated into the final completion of the building or where additional floor finishes are to be applied over mockups.

2. Provide (3) 10 feet x 10 feet mockups.

a. Demonstrate up to 4 different depths of grind as directed by Architect.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Demonstrate up to 4 different grit options as directed by Architect. Grit options should utilize the same mockups as the depth of grind mockups.
c. Demonstrate the proposed range of aesthetic effects and workmanship.
d. Demonstrate polish at walls, door jambs, interior corners, and other obstructions.

3. Notify Architect one week in advance of the dates and times when mockups will be constructed.
4. In presence of Architect, demonstrate the repair of a blemished or damaged portion of an exposed-face surface.
5. Obtain Architect's approval of mockups before start of final unit of Work.
6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement, aggregates, coloring agents, admixtures, and water are specified in Division 3 Section "Cast-in-Place Concrete".

B. Seeded Aggregate: See Section 03 30 00. Specification of seeded aggregates in a separate section is in no way intended to define individual trade, subcontractor or crew scope of work. Contractor is responsible for ensuring that placing concrete, seeding aggregate, and finishing are coordinated to obtain required results.

2.2 CONCRETE MIX

A. Concrete proportions and design requirements are specified in Division 3 Section "Cast-in-Place Concrete".

2.3 CONCRETE SEALER AND HARDENER

A. Interior Dry Grind Polished Slab: Finish System to provide specified NFSI “High Traction” rating

1. Basis of Design; FGS dry polish system by L&M construction Chemicals, Inc.
2. RetroPlate System.
3. Or approved equal.

B. Provide VOC compliant, Alkaline siliconate, liquid type, hardener, sealer and densifier for use on Flat Grind Seal (FGS) applications.

1. FGS Hardener Plus by L&M construction Chemicals, Inc.
2. RetroPlate 99 by Advanced Floor Products.
3. Consolideck LS by Prosoco.
4. Or approved equal.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.4 RELATED MATERIALS

A. Oil Repellent Sealer (where required):

1. Ready for use, quick drying, low-odor, water based solution with VOC compliant blend of silane, siloxane and fluoro-polymers.

a. Basis of design; Petrotex, by L&M Construction Chemicals, Inc. (Laticrete International, Inc.)
b. RetroPel by Advanced Floor Products.
c. Consolideck Concrete Protect Water, Oil & Stain Repellant by Prosoco.
d. Or Approved equal

B. Stain Guard Sealer (where required):

1. Ready for use, low-odor, VOC compliant top sealer that effectively protects concrete from damaging effects of staining, defacing and deterioration due to contaminant penetration and maintains slip resistance.

a. Basis of design: Permaguard by L&M Constructon Chemicals, Inc. (Laticrete International, Inc.)
b. RetroGuard by Advanced Floor Products
c. Or Approved equal

C. Grout Filler: Formulated Re-grouting filler specifically designed for repairing minor defects in polished concrete floors

1. Consolideck Grind-N-Fill.
2. Provide GM 3000 grouting system, by Husqvarna.
3. Or approved equal.

D. Crack Repair: Crack filler specifically designed for repairing minor defects in polished concrete floors

1. CreteFill Crack Repair EZ By CureCrete.

E. Concrete Repair (If allowed): single component, Decorative, rapid setting, polishable wear topping, with exposed aggregate to match polished concrete floor finish

1. Basis of design; Tru PC, By Rapid Set.
2. Or Approved equal

F. Joint Sealant

1. Interior Exposed Polished Slab:Polyurea semi-rigid, self leveling joint filler

a. Basis of Design; provide Joint Tite 750 by L&M Construction Chemicals, Inc.
b. Crete fill Pro 85 by CureCrete.
c. Or approved equal by polished floor system manufacturer.

G. Cleaning Solution

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Provide Manufacturer's recommended cleaner conditioner, required for maintaining non-slip surface finish qualities

H. Slab Protection:

1. Basis of Design: Provide HT Commercial System by Skudo or other comparable products subject to compliance with requirements.
2. Or approved equal

PART 3 - EXECUTION

3.1 FINISHES, GENERAL

A. Coordinate demolition work, new construction and phasing with all other divisions and trades.

B. Maintain uniformity of special finishes over construction joints, unless otherwise indicated.

C. Finish shall be uniform including at walls, corners, door jambs, penetrations and other obstructions.

3.2 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting application of special concrete finishes. Do not proceed with application until unsatisfactory conditions have been corrected.

3.3 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Major Defects: Areas in exposed concrete floor with defects which include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions as determined solely by the Owner and Architect will result in complete removal of concrete section from control joints outlined by the predetermined joint layout where defect occurs at no cost to the owner.

1. Patching and Repairing of major defects may be allowed if an acceptable repair can be made and approved by the architect.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Minor Defects: Patching and Repairing of areas at exposed slabs without floor coverings with surface defects which include but not limited to crazing and cracks of 0.01 inch wide or less, limited spalling, popouts, honeycombs, rock pockets, and other objectionable conditions

1. **Repair only after reviewed and approved by Architect and Engineer. UNAUTHORIZED REPAIRS CAN RESULT IN TOTAL SLAB REMOVAL AT NO COST TO THE OWNER**
2. Approved repair material is to be installed in accordance with the approved polishing system.
    a. Repair only after reviewed and approved by Architect and Engineer.
    b. Prepare mock-up of proposed repair application for review and approval of adequate size to demonstrate final appearance.
    c. Approved concrete repair materials applied to exposed concrete slabs shall be installed by a factory certified installer per manufacturer's recommendations with proven experience in repair of equal size and complexity.
    d. Contractor is NOT to install repair materials with its own forces unless certified and demonstrates previous competence in performing the designated repairs to the satisfaction of the architect. Only an experienced, certified installer hired by the contractor shall perform this work. Other installers performing this work who are not certified and meeting the requirements of this specification will be deemed inexperienced and will provide cause for possible removal and re-installation of the slab.
    e. Provide Architect with Certification and record of experience prior to start of work
    f. Application: Apply in accordance to manufacturer's written recommendations

3.4 POLISHED CONCRETE

A. General: Concrete treatment applied to all exposed interior concrete slabs shall be installed by a factory certified installer per manufacturer's recommendations with proven experience in grinding, etching, polishing and sealing slabs in fire facilities.

1. Contractor is NOT to install finish slab treatment/sealer with its own forces unless experienced and certified. Only a certified installer hired by the contractor shall perform this work. Other installers performing this work who are not certified and meeting the requirements of this specification will be deemed inexperienced and will provide cause for possible removal and re-installation of the slab.
2. Provide Architect with Certification prior to start of work.

B. Prepare and apply a flat/grind seal dry polished finish per manufacturer's recommendations.

1. Per manufacture, ground and polished floors are to be provided with three steel-trowel passes during placement.
2. Begin polishing process only after concrete has cured to 4000-psi (27.6-MPa) minimum compressive strength and a minimum age of 28 days. Verify with system manufacturer.
3. Protect surrounding finishes.
4. Verify that concrete surfaces are acceptable to receive floor treatment. Examine concrete surface to determine soundness of the concrete for polishing.
5. Remove all surface contamination to permit effective polishing
6. Install grout filler to fill minor defects per manufacturer's instructions

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Machine polish (dry polish method) concrete floors to 800 grit (level 3)

1. Slab to be prepared through the mechanical means of a rotary grinding machine as part of the FGS system or other approved non-slip polished floor system.
2. Provide polished concrete floor treatment in entirety of slab indicated on drawings. Provide consistent, uniform finish in all areas.
3. Grind/ Polish floor. Typical applications start with 30/40 grit or 60/80 grit as required to meet the required aggregate exposure determined in the approved mock-up. Applicator is to verify manufacturer's recommendations and actual slab conditions. Finish with sequential diamond grinding and polishing.
4. For bidding purposes, provide level 3 (polished) grind of top 1/8" (Class C) to expose light to course aggregate. (7 abrasive passes minimum) Actual grind will be determined by approved owner and Architect's review of Mock-up.
    a. Level of grind and number of passes will be determined and based on the floor flatness specified in section 03 30 00 for new slabs.
    b. Level of grind and number of passes will be determined and based on the floor flatness identified during pre-bid walkthrough for existing slabs.

D. Apply Sealer as required in these specifications in application steps as recommended by manufacture polishing system sequencing for the desired polish level. (2-coats minimum)

1. Install minimum of 2 coats densifier/hardener sealer to treated floor surfaces in accordance with manufacturer's instructions.
    a. First coat of FGS Hardener Plus at 250 ft2/gal (6.25 m2/L), following the 400 grit level. (if allowed Lion Hard @ 400-600 sq ft / gallon)
    b. Second coat of FGS Hardener Plus at 350 ft2/gal (8.75 m2/L), prior to the final polishing pass (if allowed Lion Hard @ 600-800 sq ft / gallon)
    c. Additional coats as required to provide required sealed surface.
    d. Follow manufacturer's recommendations for drying time between successive coats
2. Install Joint Sealant per manufacturer's instructions after final grind
3. Apply stain guard sealer as required by installation instructions after major construction operations have ceased.(per finish schedule)
4. Apply oil repellant sealer as required by installation instructions after major construction operations have ceased (per finish schedule)
5. Provide final burnishing and protect until final cleaning.

3.5 PROTECTION

A. Finish Slab Protection:

1. Protect slab per section 03 3300 from all construction related work to prevent vehicle fluid leaks, chips, dings, cracks or other damage at all times, prior to and immediately after special finishing process.
2. Allow no standing water on concrete slab
3. Protect from all petroleum stains during construction
4. Diaper all hydraulic powered equipment
5. Do not park vehicles on inside of slab

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. No pipe cutting machines to be used on inside floor slab
7. Do not place reinforcing steel or any other steel on interior slab, to avoid rust stains
8. Do not use acids or acidic detergents on slab
9. Pick up all nails and other fasteners immediately to keep the floors clean and free of rust staining, chipping and other related damage at all times.

B. Inform all trades that the slab shall be protected at all times.

3.6 ADJUSTMENTS

A. Re-polish those areas not meeting uniform specified gloss levels per mock-up.

B. Over fill joints and cut flush to surface prior to the start of final polishing operations (after stain/Dye has been applied).

3.7 REPAIRS AND CLEANING

A. Adjacent surfaces shall be protected from damage from concrete finish system. Replace any damaged finishes.

B. Repair damaged special concrete-finished surfaces to match color, texture and uniformity of surrounding surfaces and to match repairs to approved mockups. DAMAGED SLABS WILL BE REPLACED IN THEIR ENTIRETY at no cost to the Owner, if repairs cannot be performed to match adjacent finishes.

C. Clean surfaces given special concrete finishes after treatment to remove stains, markings, dust and debris.

1. Final Cleaning shall include final mechanical polishing with manufacturer's recommended cleaner / conditioner.

D. Wash and rinse surfaces according to special concrete finish applicator's recommendations. Protect other Work from staining or damage due to cleaning operations.

1. Do not use cleaning materials or processes that could change the appearance of concrete finishes.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Precast architectural concrete coping caps units.

B. Related Sections:

1. Section 01 81 13 “Sustainable Design Requirements” for applicable LEED requirements.
2. Section 03 30 00 “Cast-in-Place Concrete”.
3. Section 04 20 00 “Unit Masonry”.

1.3 DEFINITION

A. Design Reference Sample: Sample of approved precast architectural concrete color, finish and texture, preapproved by Architect.

1.4 LEED

A. This project is targeting a LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Product Data: For each type of product indicated.

B. Sustainable Design Submittals:

C. Product Data for Credit MR 4 and Credit MR 5 For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content and regional materials data.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Include statement indicating costs for each product having recycled content.

E. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

F. Shop Drawings: Detail fabrication and installation of precast architectural concrete units. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit. Indicate joints, reveals, and extent and location of each surface finish. Indicate details at building corners.

G. Samples: For each type of finish indicated on exposed surfaces of precast architectural concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast architectural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast architectural concrete units indicated.

C. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Precast architectural concrete Products."

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.2 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent. 30% fly ash.
2. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.3 MORTAR MATERIALS

A. MORTAR: Type N, ASTM C 270

2.4 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Limit use of fly ash and silica fume to 30 percent of portland cement by weight.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast architectural concrete fabricator's option.

C. Water soluble chloride ions shall not be present.

D. Normal-Weight Concrete Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi minimum.

E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.5 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed precast architectural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.

2. Edge and Corner Treatment: Uniformly radiused.

2.6 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast architectural concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in precast architectural concrete units as required and indicated on the Contract Drawings.

D. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.

E. Reinforce precast architectural concrete units to resist handling, transportation, and erection stresses.

F. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

G. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 117.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

I. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.

J. Identify pickup points of precast architectural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast architectural concrete unit on a surface that will not show in finished structure.

K. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

L. Discard and replace precast architectural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.7 FINISHES

A. Unit faces shall be free of joint marks, grain, mottling, halo and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of precast architectural concrete units to match approved design reference sample and as follows:

1. Color: As selected by Architect from manufacturer's full range.
2. Precast concrete coping cap units: Light Abrasive-Blast Finish: Use abrasive grit, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.

B. Finish unexposed surfaces of precast architectural concrete units by float finish.

C. Corners - Typical: Provide lightly dulled, 1/4-inch radius. sharp corners or chamfers are not permitted.

2.8 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast architectural concrete units to supporting members and backup materials.

B. Erect precast architectural concrete units level, plumb, and square within specified allowable tolerances and without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
2. Unless otherwise indicated, provide for uniform joint widths of 3/8 inch.

C. Connect precast architectural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

D. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

E. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

F. Setting: Acurately set Precast Architectural Concrete per Cast Stone Institute Standard Specifications, and in accordance with the design drawings, shop drawings and setting drawing.

1. Every Stone must be set in a full bed of mortar with all vertical joints flushed full, unless otherwise noted.
2. All anchors and dowels shall be firmly placed with all anchor holes and dowels and similar holes, filled completely with mortar.
3. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set.
4. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

3.2 REPAIRS

A. Repair damaged precast architectural concrete units if permitted by Architect. The Architect reserves the right to reject repaired units that do not comply with requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.

C. Remove and replace damaged precast architectural concrete units when repairs do not comply with requirements.

3.3 CLEANING

A. Clean surfaces of precast concrete units exposed to view.

B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Clay face brick (without holes).
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under this Section:

1. Precast Architectural Concrete
2. Steel lintels in unit masonry.
3. Steel shelf angles for supporting unit masonry.
4. Steel plates and angles for architectural trim.
5. Cavity wall insulation.

C. Related Requirements:

1. Section 01 81 13 “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Section 03 45 00 “Precast Architectural Concrete” for precast architectural concrete coping caps.
3. Section 05 12 00 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
4. Section 05 50 00 "Metal Fabrications" for ledgers, steel lintels, and fabricated metal trim for masonry.
5. Section 07 19 00 "Water Repellents" for water repellents applied to unit masonry assemblies.
6. Section 07 21 00 "Thermal Insulation" for cavity wall insulation.
7. Section 07 62 00 "Sheet Metal Flashing and Trim" for [exposed] sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
8. Section 07 92 00 "Joint Sealants" for sealants installed at masonry joints.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Submit under provisions of Section 01 3300

B. Product Data: For each type of product.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13

D. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.[
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

E. Samples for Initial Selection:

1. Clay face brick, in the form of straps of five or more bricks.
2. Colored mortar.
3. Weep holes/cavity vents.

F. Samples for Verification: For each type and color of the following:

1. Clay face brick, in the form of straps of five or more bricks.
2. Special brick shapes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
4. Weep holes and cavity vents.
5. Accessories embedded in masonry.

1.7 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Qualification Data: For testing agency.

C. Material Certificates: For each type and size of the following:

1. Masonry units.
    a. Include data on material properties material test reports substantiating compliance with requirements.
    b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    c. For exposed brick, include test report for efflorescence according to ASTM C67.
    d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C67

2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.8 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.

1. Build sample panels for each type of exposed unit masonry construction typical exterior and interior walls in sizes approximately **48 inches (1200 mm)** long by **48 inches (1200 mm)** high[by full thickness.
2. Protect approved sample panels from the elements with weather-resistant membrane.
3. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.10 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry per general structural notes on drawings

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.

2.4 CONCRETE MASONRY UNITS (CMUs)

A. Sustainable design requirements

B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners unless otherwise indicated.

C. CMUs: ASTM C90.

1. Unit Compressive Strength: See General Notes on Structural Drawings
1. Density Classification: See General Notes on Structural Drawings.
2. Size: (8”x8”x16”) nominal Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.

2.5 BRICK

A. Sustainable design requirements

B. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

C. Clay Face Brick: Facing brick complying with ASTM C216

1. Mutual Materials or equal
2. Grade: MW or SW.

3. Type: FBX,

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C67.

5. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."

6. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C67 with no observable difference in the applied finish when viewed from 10 feet (3 m)

7. Shape: (Actual Dimensions): 3-1/2 inches (89 mm) wide by 2-1/2 inches (64 mm) high by 7-1/2 inches (190 mm) long. Solid Brick (no holes), 3-1/2 inches by 7-1/2 inches is the exposed exterior face for shiner bond.
8. Application: Use where brick is exposed unless otherwise indicated.
9. Color and Texture: As selected by Architect. Provide for two (2) custom colors with coated mission texture.

2.6 MORTAR AND GROUT MATERIALS

A. General: Provide mortar and grout to conform with requirements in General Notes on Structural Drawings.

B. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

C. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

D. Aggregate for Grout: ASTM C404.

E. Water: Potable.

2.7 REINFORCEMENT

A. General: Provide Reinforcing to conform with requirements in General Notes on Structural Drawings.

2.8 TIES AND ANCHORS

A. General: Provide ties and anchors to conform with requirements in Structural Drawings.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.

C. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Stainless Steel Wire: ASTM A580/A580M, **Type 304**.

2.9 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch (0.40 mm) thick.
2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.

3. Fabricate through-wall flashing with drip edge **unless otherwise** indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees[**and hemmed**].

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, or urethane.

B. Weep/Cavity Vent Products: Use **one of** the following unless otherwise indicated:

1. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch (9-mm) OD by 4 inches (100 mm) long.
2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
    a. Wire-Bond
    b. Hohmann & Barnard, Inc
    c. Or approved equal

C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.by:

1. Wire-Bond
2. Hohmann & Barnard, Inc
3. Or approved equal

4. Configuration: Provide one of the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

2.11 MASONRY CLEANERS

A. Proprietary Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Available products:

a. Fabrikleen Masonry Cleaner Type L. By Fabrikleen Chemicals, International.
b. SureKlean 600 by Prosoco, inc
c. Or approved equal

2. Do Not Use Muriatic Acid

2.12 MORTAR AND GROUT MIXES

A. General: Provide mortar and grout to conform with requirements in General Notes on Structural Drawings.

B. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

C. Mortar for Unit Masonry: Comply with ASTM C270, **Proportion Property** Specification. Provide the following types of mortar for applications stated unless another type is indicated **or needed to provide required compressive strength of masonry**.

1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use **Type S**.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products].

1. Pigments shall not exceed 10 percent of portland cement by weight.

2. Mix color as selected by Architect.
3. Application: Use pigmented mortar for exposed mortar joints with the following units:

a. Clay face brick.

E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

F. Grout for Unit Masonry: Comply with ASTM C476.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. General: Provide mortar and grout to conform with requirements in General Notes on Structural Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). **Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).**
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in shiner, stack bond.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than **4 inches (100 mm)**]. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

3.5 MORTAR BEDDING AND JOINTING

A. Lay **CMUs** as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush where indicated to receive brick facing veneer

3.6 COMPOSITE MASONRY

A. Bond wythes of composite masonry together as required by Structural Drawings

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.7 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing with seismic masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached and seismic anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed connector sections in masonry joints.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated in structural drawings

B. Provide airspace between back of masonry veneer and face of sheathing or insulation as indicated on drawings.

1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form expansion joints in brick as follows:

1. Form open joint full depth of brick wythe and of width indicated, but not less than **3/8 inch (10 mm)**] for installation of sanded sealant and backer rod specified in Section 07 92 00 "Joint Sealants."

C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than **3/8 inch (10 mm)**.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

A. Install steel lintels where indicated.

B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.10 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. **Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.**

B. Install flashing as follows unless otherwise indicated:

1. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (200 mm); and fluid applied **weather/air barrier**, lapping upper edge with least 4 inches (100 mm) fluid applied flashing.
2. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.

C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

1. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.

D. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.11 REINFORCED UNIT MASONRY

A. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

B. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than **60 inches (1520 mm)86 m)**.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level C in TMS 402/ACI 530/ASCE 5.

C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C67 for compressive strength.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

I. Prism Test: For each type of construction provided, according to ASTM C1314 at 7 days and at 28 days.

3.13 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary cleaner applied according to manufacturer's written instructions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.14 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Architecturally Exposed Structural Steel (AESS).
3. Grout.

B. Related Sections include the following:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Division 05 Section "Metal Fabrications" for other metal items not defined as structural steel.
4. Division 09 Section painting Sections for surface preparation and priming requirements.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

B. AESS: Structural Steel that is exposed is considered to be, Architecturally Exposed Structural Steel (AESS) in the Contract Documents. See Architectural drawings for extents.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13

2. Product Data for Credit MR 4 Credit MR 5 For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.

a. Include statement indicating costs for each product having recycled content.

C. Shop Drawings: Show fabrication of structural-steel components.

1. Submit Shop Drawings and Erection Drawings prior to start of fabrication.
2. Indicate connections. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths and designation of electrodes.
3. Verify all dimensions and correlate work with adjoining work.
4. Indicate locations and details of bearing plates to be anchored or embedded in other construction and all erection connections and accessories required.
5. Indicate size, type, grade, profiles, spacing, and location of all members, openings, and attachments.
6. Indicate cambers.
7. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
8. Show the piece mark numbers on the erection drawings.
9. Indicate surface preparation, finishes, and shop primer.

D. Template Drawings and Placement Plans: As required for satisfactory placing, connection, and anchorages

E. Welding certificates: To be available for review by Inspection Agency.

F. Qualification Data: For installer and fabricator and professional engineer.

G. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Direct-tension indicators.
4. Tension-control, high-strength bolt-nut-washer assemblies.
5. Shop primers.
6. Nonshrink grout.

H. Source quality-control test reports.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. Comprehensive engineering analysis of steel joists signed and sealed by the qualified professional engineer responsible for its preparation.

J. Certified Manufacturer's Test Reports: All Steel Receiving Seismic Critical Welds: Tensile tests and chemical analysis, including all trace elements.

K. Maintain one copy of each document on-site.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer with sufficient personnel and a minimum of five years' experience with successfully completed structural steel work similar in complexity to this project.

B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant for Conventional Steel Building Structures (SBD). Fabricator shall be approved by the authorities having jurisdiction.

1. Uncertified Fabricators: May be used subject to approval of the Building Department / Architect / Structural Engineer and confirmed in writing. Uncertified fabricators shall pay for the cost of periodic plant inspections by the Owner's special inspector.

C. Welding Standards: Comply with AWS D1.1, "Structural Welding Code--Steel."

1. Qualifications for Welding Work: Qualify welding personnel in accordance with AWS D1.1, "Qualification," and WABO (or approved equal) requirements or approved equal.
   a. Qualify welders in accordance with AWS D1.1 for each process, position, and joint configuration.
   b. Welders who have not used the welding process for a period of 6 or more months shall be requalified.
   c. If recertification of welders is required, retesting will be the Contractor's responsibility.
   d. WPSs for each joint type shall indicate proper AWS qualification and be available where welding is performed.

D. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."
4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
5. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."
6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
7. American Welding Society (AWS) D1.1, "Structural Welding Code."
8. International Building Code (IBC), 2015, where not in conflict with AISC provisions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Perform work defined as AESS in accordance with AISC, "Code of Standard Practice for Steel Buildings and Bridges."

F. Prefabrication/Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Attendees: At a minimum, the Contractor, Inspector, Fabricator, and Erector.
2. Review inspection procedures, welding requirements, submittal process, and special project details and issues.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver structural steel to project site in such quantities and at such times as to ensure the continuity of installation. Include templates and instruction for the proper setting of anchor bolts.

B. Store materials to permit easy access for identification and any inspection not completed in the fabrication shop. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.

C. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION AND SEQUENCING

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

B. Coordinate schedule with other trades where attachments or interferences occur.

C. Schedule and sequence fabrication to coordinate with installation schedules and progress schedule.

1.9 FIELD MEASUREMENTS

A. Verify that field measurements and conditions are as shown on drawings, shop drawings, or as instructed by Product Manufacturer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.10 REDESIGN

A. Obtain written acceptance from the Architect/Structural Engineer for Contractor-initiated redesign or departures from that indicated by the contract documents.

B. Contractor to Bear costs for Contractor-initiated or construction error caused changes to type, form, system, or details of construction from those indicated by the contract documents.

C. Contractor to Pay the engineering fees required by the Structural Engineer to check the adequacy of such changes.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Steel Materials: Provide structural steel shapes, plates, angles, and bars of size, type, and quality as shown on the Drawings. Steel that is badly corroded or damaged in the opinion of the Inspector, shall not be incorporated in the Work. Steel materials shall conform to the Structural Drawings.

B. Carbon-Steel Bolts and Threaded Fasteners: Comply with structural drawings and general notes and ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.

C. Welding Materials and Electrodes: Comply with AWS.

D. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

2.2 BOLTS, CONNECTORS, ANCHORS AND BEARINGS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain at interior; Hot-dip zinc coating, ASTM A 153/A 153M, Class C, where exposed to weather.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain at interior; Mechanically deposited zinc coating, ASTM B 695, Class 50, where exposed to weather.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Welded Headed Stud Connectors: Unless otherwise noted, ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

D. Unheaded Anchor Rods: ASTM F 1554, Grade 36, unless grade indicated otherwise on drawings.

1. Configuration: Straight.
2. Nuts: ASTM A 563 heavy hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 hardened carbon steel.
5. Finish: Plain at interior; Hot-dip zinc coating, ASTM A 153/A 153M, Class C, where exposed to weather.

E. Headed Anchor Rods: ASTM F 1554, Grade 36, unless grade indicated otherwise on drawings, straight.

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 hardened carbon steel.
4. Finish: Plain at interior; Hot-dip zinc coating, ASTM A 153/A 153M, Class C, where exposed to weather.

F. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish: Plain at interior; Hot-dip zinc coating, ASTM A 153/A 153M, Class C, where exposed to weather.

G. Eye Bolts and Nuts: ASTM A 108, Grade 1030, cold-finished carbon steel.

H. Sleeve Nuts: ASTM A 108, Grade 1018, cold-finished carbon steel.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time. Minimum compressive strength shall be 6,000 psi.

2.4 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."

1. Camber structural-steel members where indicated. Fabricate all beams with rolling camber up.
2. Mark and match-mark materials for field assembly.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Continuously seal joined members exposed to weather by continuous welds. Grind exposed welds smooth for architecturally exposed structural steel or as indicated in contract documents.

C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

D. Bolt Holes: Cut, drill, or punch bolt holes perpendicular to metal surfaces. Provide standard bolt holes unless indicated otherwise on drawings. Holes shall be accurately centered and shall register true upon erection. Poor matching of holes shall be cause for a rejection. Small errors may be repaired by drilling or reaming, with prior approval of Engineer/Architect.

E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

F. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning" or SSPC-SP 2, "Hand Tool Cleaning."

G. Welded Headed Stud (WHS) Connectors: Prepare steel surfaces as recommended by manufacturer of WHS connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

H. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

I. Plane bearing surfaces to true beds. Abutting surfaces shall be closely fitted. All columns and all bearing stiffeners shall be milled to give full bearing.

J. Clean contact surfaces in accordance with AISC specifications before assembly. Bring assembled parts into close contact. Use drift pins only for aligning members and shall not be used in a manner which will damage metal or enlarge or distort holes. Members requiring accurate alignment shall be provided with slotted holes and/or washers for truing up the steel as required. All finished members shall be true to line and free from twists, bends, and open joints.

K. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

L. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations. Finish surfaces of members exposed in the final structure shall be free of markings, burrs, and other defects.

M. Built-up sections shall be made to warpage and alignment tolerances in conformance with AISC and AWS specifications. Shop splices in elements shall be completed prior to welding elements together.

2.5 DIMENSIONAL TOLERANCES

A. Fabrication Tolerances: Unless otherwise noted, fabricate structural members to referenced AISC Specifications for allowable tolerances. Do not camber in excess of amounts shown on drawings.

1. Straightness: Structural members of a single rolled shape or built-up structural member shall be straight within the tolerances allowed for wide flanged shapes by ASTM A 6.
2. Length: With both ends finished for contact bearing, maximum variation of overall length equals 1/32-inch. For members without ends finished for contact bearing, maximum length variation equals 1/16-inch for lengths up to 30 feet and 1/8-inch for members over 30-feet long.

B. For members designated as AESS, tolerances shall be as allowed by the AESS section of the AISC Code of Standard Practice for Buildings and Bridges.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Pretensioned, unless indicated otherwise on drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
2. Architecturally exposed structural steel:
    a. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
    b. Verify that weld sizes, fabrication sequence, and equipment used will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
        1) Grind butt welds flush.
        2) Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.7 PRIMER

A. Shop priming is in addition to priming and painting applications specified in other sections

B. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. Galvanized surfaces.

C. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated steel members and accessories by hand-tool cleaning, SSPC-SP 2.

D. Shop Coat Primer Paint: Apply one coat of shop primer to provide a continuous, dry film not less than 1.5 mils thick per coat of primer as listed below or an approved equal.

1. Apply two coats of shop primer to surfaces inaccessible after assembly or erection.
2. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer.
3. Shop-Applied Zinc-Rich Primer (for steel not galvanized and exposed to weather in its final position, including all AESS, and as otherwise specified): Shop preparation shall be SSPC Method SP-6.

a. "CarboZink 859" by Carboline Company, "Tnemec-Zinc 90-97" by Tnemec Company, or "Zinc Clad III HS B69A100/B69V100/B69D11" by Sherwin Williams. Color selected by Engineer/Architect.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: For the steel indicated to be galvanized, apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.

1. Galvanize all structural steel exposed to weather, not otherwise indicated as architecturally exposed structural steel (AESS).
2. Galvanize all structural steel noted to be galvanized in contract drawings.
3. Fill vent holes and grind smooth after galvanizing.
4. Galvanize lintels and shelf angles attached to structural steel frame and located in exterior walls.
5. Galvanize all steel embedded in concrete or mortar.
6. Galvanize all buried steel.
7. Galvanized Finish Touch-Up: Touch-up paint shall be an organic cold-galvanizing compound having a minimum of 94 percent zinc dust in dry film. "CarboZink 859" as manufactured by Carboline, St. Louis, MO, Tnemec-Zinc 90-97" by Tnemec Company, or "Zinc Clad III HS B69A100/B69V100/B69D11" by Sherwin Williams.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.9 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to erection, verify elevations of concrete- and supporting surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.3 ERECTION

A. Set structural steel, joists and accessories plumb, square, and true to line accurately in locations and to elevations indicated and according to SJI's specifications and AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings."

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.

1. Set base plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and base plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for non-shrink grouts.

C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated. Fasten splices of compression on members after bringing abutting surfaces completely into contact.

F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Engineer.

H. Reaming: Light drifting will be permitted to draw the parts together but drifting to match unfair holes will not be permitted. Any enlargement of holes necessary to make connections in the field shall be done by reaming with twist drills, care being taken not to weaken the adjoining metal. If, in the judgment of the Engineer/Architect, the extent of the reaming is such that holes cannot be properly filled or accurately adjusted after reaming, the faulty member shall be discarded and replaced with a new one, and all costs and expenses resulting there from shall be paid by the Contractor.

I. Cutting and Fitting: No cutting of sections, either flanges, webs, stems or angles shall be done by the Contractor without the consent of the Engineer/Architect, unless this cutting is particularly specified or shown on the drawings.

J. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of the shop paint. Apply paint to exposed areas with the same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

K. Touch-Up and Repair of Galvanizing: Immediately after erection, clean and repair any damaged galvanizing as outlined in previous section regarding galvanizing.

L. Fire retardant blankets shall be employed to completely contain arcs and spatter associated with welding during erection.

M. Weld dams shall not be used.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. AESS: Install bolts with heads in matching orientation.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

C. AESS: Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

1. Grind butt welds flush.
2. Grind or fill exposed fillet welds ½-inch and larger to smooth profile. Dress exposed welds.

D. Erection Connections, etc: Place holes, plates, or other attachments required by the Erector so as not to interfere with or cause any other detrimental effect to structural members or their connections.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

C. Visually inspect bolted connections.

D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with construction documents.

E. Perform additional testing to determine compliance of corrected Work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnishing Buckling Restrained Braces (BRB's).

B. Engineering design of BRB's and BRB gusset plates.

C. Qualification of BRB's by uniaxial and subassemblage cyclic testing. If a pin and collar connection is used the subassemblage test need not be performed.

1.2 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel: For installation of BRB's and furnishing of connection hardware for BRB's, including loose plates and fasteners.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual.

B. AISC 341 - Seismic Provisions for Structural Steel Buildings.

C. AISC 360 - Specification for Structural Steel Buildings.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

F. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

G. AWS A4.3 - Standard Methods for Determination of the Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Steel Weld Metal Products by Arc Welding.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 DEFINITIONS

A. Buckling Restrained Brace (BRB): Specialty structural brace element consisting of an axial force resisting steel core encased by a system that prevents buckling of the steel core.

1.6 SUBMITTALS

A. See Section 01 30 00 – Submittal Procedures.

B. Qualification Testing Report evidencing manufacturer's compliance with specified Qualification Tests.

1. The Qualification Testing Report shall conform to requirements of *Section K3* of the AISC 341 American Institute of Steel Construction "Seismic Provisions for Structural Steel Buildings".
2. If project specific testing is required to supplement available test data, include schedule for fabrication of BRB test specimens, description of proposed testing program and name of test facility and schedule for testing and reporting.

C. Manufacturer's Quality Assurance Plan: Conform to requirements of "Quality Assurance" Article.

D. Engineering Design: Refer to specified "Design and Performance Requirements" Article for design requirements.

1. Design Drawings: Show size and configuration of steel core for full length of BRB. Indicate casing size, thickness and length. Show gusset plate designs, including all information necessary to fabricate and install gussets.
2. Calculations: Provide design calculations showing the adequacy of proposed BRB's to achieve Performance Requirements specified herein. Include design calculations for all gusset plate connections.
3. Certification: In accordance with "Design and Performance Requirements" Article.
4. Preliminary Design: Submit an initial submittal of the items listed above, based on assumed material properties, prior to delivery of materials to be employed in work.
5. Final Design: Submit final drawings, calculations and certifications that include the final dimensions of steel core plates based on results of coupon testing of steel to be employed in Work. Include final calculations for gusset plate connections.
    a. The Design Engineer shall seal final calculations and required certification.
    b. Submittal shall be accompanied by the results of coupon testing.

E. Delegated-Design Submittal: For buckling restrained braces indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for braces and connections.

1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 – Submittal Procedures. Transmit a copy of each submittal indicating agency approval to the Architect of Record.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Erection Drawings:

1. Show location and size of BRB's. Give complete information necessary for fabrication of elements of structural steel frame to receive braces and fabrication of connection plates. Show methods of assembly, including type and size of bolts and/or pins, hole diameter, and preparation and finish of faying surfaces. Identify tolerances for fabrication and erection.

G. Submit certified material test reports to *Independent Special Inspector* and Engineer of Record for record purposes.

1. All steel: Tensile tests and chemical analysis. Include trace elements for steel core plates.
2. Steel Core Plates:
   a. Coupon test results for each lot of steel used in fabrication showing initial yield, ultimate tensile stress, and ultimate elongation.
   b. Charpy V-Notch testing for plates 2 inches and thicker.
3. Welding Electrodes: Include tensile, elongation, and CVN toughness tests. Identify diffusible hydrogen.

H. Submit Quality Assurance test and inspection reports to *Independent Special Inspector* and Engineer of Record for record purposes prior to shipping of braces.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Shall have manufactured and successfully tested braces in accordance with specified "Qualification Tests" Article.

B. Design Engineer Qualifications: Structural Engineer, registered in the State where the project is located, that is knowledgeable with the results of cyclic testing of BRB's and experienced in the design of BRB's based on engineering analysis.

C. Quality Assurance Plan: The manufacturer shall have a detailed Quality Assurance Plan to evidence that the BRB's being manufactured continue to be the same as those tested. The Plan shall include the following elements:

1. Indicate how the product is to be identified, such that it can be traced back to production quality assurance records.
2. Include a flow chart of the process by which the product is manufactured, including description of production methods.
3. List tests for materials, including the applicable recognized standard for each test and the qualifications of testing agency and/or personnel.
4. Identify manufacturing tolerances for each production process.
5. In-process quality control, including all points of internal inspection for control and monitoring of the fabrication and assembly process.
   a. Include copies of forms and checklists used to document inspections.
   b. Include required qualifications of personnel performing each inspection.
   c. Identify how inspection reports are reviewed and approved.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. Plan shall also include manufacturer furnished quality assurance for erection, including, at a minimum, attendance at pre-erection conference and a minimum of two visits thereafter to observe installation of braces.

D. Qualification Testing: Refer to "Qualification Tests" Article for requirements.

E. Extrapolation of Qualification Testing: All deviations from materials, details of fabrication, and quality assurance controls used for the fabrication of tested prototype braces shall be identified by manufacturer and reviewed by Design Engineer to ensure that production braces meet or exceed the level of quality used in fabrication of prototype braces. Include the following items:

1. Weld filler material, including CVN toughness.
2. Welding procedures and details, including weld terminations.
3. Shape and finish of plate edges at transitions.
4. Finish of plate edges, including roughness and treatment of occasional notches.
5. Tolerances for flatness and straightness of plates.
6. Details of isolation between plates and core at transitions, to accommodate lengthening and shortening.
7. Type and thickness of coating materials.

F. Pre-Erection Conference: Contractor shall schedule meeting with Owner's Representative, BRB-manufacturer, and the steel erector's personnel supervising installation of buckling restrained braces to review installation procedures including handling, fit-up and fastening.

G. Brace Fabricator shall be AISC Certified (Category BU). Non-certified fabricators may be used provided that the fabricator pays for the cost of the Independent Special Inspections at the fabrication shop.

PART 2PRODUCTS

2.1 DESIGN AND PERFORMANCE REQUIREMENTS

A. Delegated Design: Design buckling restrained braces, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Washington, using performance requirements and design criteria indicated.

B. Design Requirements:

1. Engage a Structural Engineer, licensed in the State where the project is located, to design braces to achieve the Performance Criteria. Design shall be based on detailed examination and understanding of the results of qualifying cyclic tests and interpolation of results to project conditions.
2. Interpolation of test results for different member sizes shall be justified by rational analysis that demonstrates stress distributions and magnitudes of internal strains that are consistent with or less severe than the tested assemblies and that considers the adverse effects of larger material and variations in material properties.
3. Consider the effect of imposed end rotations.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Casing shall have the minimum moment of inertia, where indicated on documents (moment of inertia is measured perpendicular to the plane of the frame)
5. BRB manufacturer shall design all brace connections, including gusset plates. Gusset plate design shall be in accordance with AISC 341 and AISC 360 and based on the Uniform Force Method in accordance with Part 13 of the AISC Manual (alternate rational methods may be used subject to approval by Engineer of Record.) Refer to structural drawings for additional gusset plate design requirements. Gusset plate design shall include a check of Web Local Yielding and Web Local Buckling in accordance with AISC 360 *Section F4*. BRB manufacturer to design and specify stiffener plate or doubler plates where required to reinforce web.

C. Performance Criteria:

1. Initial "BRB" yield stress shall be as indicated, within the range specified on the Contract Documents. Core area shall be as indicated.
2. Braces shall be designed, tested, and detailed to accommodate expected deformations in accordance with AISC 341-10. Expected deformations are those corresponding to a story drift of at least 2% of the story height or two times the design story drift, whichever is larger. Design story drifts are as follows:

   Roof = 1.5 inches

3. Braces shall provide for stable cyclic displacement within the ranges required per AISC 341.

   a. Hysteretic behavior in the non-linear range shall show no sign of degradation or loss of strength.
   b. Graphs of test results shall show no signs of pinched hysteretic behavior.

4. The portion of the steel core that projects beyond the casing shall provide for stable cyclic loading.
5. Tension and compression shall be resisted entirely by the steel core. The buckling restraining system shall prevent brace buckling and control plate buckling without restraining the steel core from transverse expansion and longitudinal shortening for deformations corresponding to 2 times the design interstory drift or 2% of the story height, whichever is greater.
6. End connections and connection configuration, including gusset stiffeners, must be similar to the tested conditions.

D. Coupon Tests: Perform coupon test results for each lot of steel used in fabrication of steel core areas showing initial yield, ultimate tensile stress, and ultimate elongation. Coupons shall be taken from plates at point of brace manufacture and shall be used as the basis for brace design.

E. Qualification Tests: The design of braces shall be based on results from qualifying *cyclic tests performed by the manufacturer*. Tests shall consist of at least two successful cyclic tests: one is required to be a test of a brace subassemblage that includes brace connection imposed rotations and the other may be either a uniaxial or subassemblage test. If a pin and collar connection is used the subassemblage test is not be required.

1. Qualification Tests shall conform to requirements of *Section K3* of the AISC 341.
2. Qualification tests are permitted to be based on documented full-scale cyclic tests performed for other projects or tests reported in research, provided that there is sufficient basis for extrapolation to project conditions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Extrapolation of previous test results beyond the limitations of AISC 341 *Section K3* will not be permitted.

F. Architecturally Exposed Braces: Where braces are exposed to view upon completion of the project, the braces shall meet the Architecturally Exposed Structural Steel (AESS) requirements of section 05 12 00.

G. Braces exposed to exterior: Braces that occur outside of the building envelope shall be sealed to protect the core from moisture infiltration.

2.2 ACCEPTABLE MANUFACTURERS

A. The following manufacturer's, which have successfully completed qualification testing of braces similar to those required for the project, will be considered acceptable manufacturers, subject to compliance with other requirements of the Contract Documents, including limitations on maximum brace dimensions.

1. Unbonded Brace by Nippon Steel Engineering USA, Inc.
2. CoreBrace, LLC

B. "BRB" approved equal: "BRB" manufacturers other than listed above shall demonstrate conformance with the specified "Design and Performance Requirements" Article. The Contractor shall submit a proposal to the Architect and Design Team for an alternative as "an equal" in writing prior to the submittal of bids. The Contractor is solely responsible for timely submittal of its proposed "or equal". The proposal for an alternative as "an equal" shall conform to the following requirements:

1. Include complete information necessary to permit determination of conformance with the specified "Design and Performance Requirements" Article. The burden of proof shall be solely on the Contractor to demonstrate that the proposed "BRB" product meets the Design and Performance Requirements. The Contractor shall furnish at its own expense all information necessary for a determination to be made by the Architect and Design Team as to whether the Design and Performance Requirements will be met. The Contractor must pay the Architect's and Design Team's fees associated with the review of the proposal for an alternative as "an equal".
2. If the Contractor proposes a "BRB" product that does not conform to the Design and Performance Requirements, Contractor must submit a cost impact evaluation, and must pay the Architect's and Design Team's fees associated with the review of the non-conforming "BRB" product. In addition, the Contractor must pay the Architect's and Design Team's fees associated with redesign of building components impacted by the non-conforming "BRB" product. By submitting a non-conforming "BRB" product, the Contractor waives any rights to claim a delay due to the processing of the proposal. The Contractor shall be solely responsible for any cost increases or delays resulting from use of the proposed non-conforming "BRB" product without recourse for reimbursement.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 MATERIALS

A. Steel Core Areas: ASTM A36/A36M; except initial yield stress shall be within the range shown on the Contract Documents, as evidenced by coupon testing of plates to be incorporated in work.

1. Plates 2 inches (50 mm) and thicker shall be supplied with Charpy V-Notch testing in accordance with AISC 341-10 section A3.3.

B. Casing: ASTM A500/A500M, Grade B (ASTM A53 where round sections indicated).

C. Welding Filler Material: Meet or exceed CVN toughness and elongation of material used for fabrication of tested assemblies.

1. H16 (diffusible hydrogen), AWS A4.3.

D. Shop Primer – apply to casing. See Section 05 12 00 - Structural Steel.

E. Debonding Agent: Manufacturer's standard; demonstrated suitable to maintain separation of steel core and grout encasement when subjected to a minimum of 30 cycles of inelastic yielding at 2.0 percent strain; resistant to aging effects for a life cycle of 50 years.

F. Fill Material: Manufacturer's standard cementitious grout; demonstrated suitable for function as a confining in-fill material by uniaxial or subassemblage qualification testing.

2.4 FABRICATION

A. Fabricate steel in accordance with Section 05 12 00 - Structural Steel.

1. Cut core plates to profile shown on Design Drawings. Conform to tolerances of Quality Assurance Manual, except tolerance on plate width shall not exceed plus or minus 0.2 inches.
2. Splices in the steel core are not acceptable.
3. Roughness: After cutting, edges of core plates shall have roughness less than 1000 micro-inches.
4. Gouges and Notches: Occasional gouges and notches less than 0.2 inches deep in edges of core plates may be repaired by grinding to a smooth transition. The length of transition shall be a minimum of 10 times the depth of gouge. The area shall be inspected by MT after grinding to ensure the entire depth of gouge has been removed. Deeper gouges shall be cause for rejection of piece.

B. The maximum dimensions of the casing of the buckling restrained brace shall be as indicated on the Contract Documents.

C. The basis of design is that all BRB connections will be welded. Bolted connections may be used subject to approval by the contractor and Engineer of Record.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Where cruciform plates are terminated in core, pay particular attention to the detailing and finishing of weld termination; meet or exceed qualification tested assembly as minimum standard.

D. Assembly: Assemble components of the Buckling Restrained Brace in a manner to ensure proper performance of the brace.

1. Examine steel core areas for straightness prior to coating with debonding agent or pouring with concrete.
2. Provide end-confining plates to ensure confinement of the fill material while allowing for non-restricting movement of the steel core.
3. For braces exposed to exterior or corrosive conditions, interior of brace shall be sealed or otherwise protected from moisture/corrosive element infiltration into the interior core region. See contract documents for locations of exposed braces.

2.5 SOURCE QUALITY CONTROL

A. Independent Special Inspector will:

1. Review Manufacturer's Quality Assurance Plan, mill certificates and results of coupon testing.
2. Review Manufacturer's quality assurance test and inspection reports.
3. If fabrication shop is not AISC certified, provide special inspection at fabrication shop as required per General Structural Notes. If fabrication shop is AISC certified, then shop special inspection is not required.

PART 3 EXECUTION

3.1 ERECTION

A. Braces are erected under Section 05 12 00 - Structural Steel.

B. Prior to erection, clean faying surfaces of brace to be in contact with bolted connections to remove temporary coatings applied for transport and surface contaminants.

C. Buckling restrained braces shall not be field cut or altered. Alterations to structural steel components to receive Buckling Restrained Braces shall be as permitted by Section 05 12 00.

D. No field welding to buckling restrained brace members will be permitted, including attachment of nonstructural components.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. K-series joists
2. LH- and DLH-series long-span steel joists.
3. Joist accessories.

B. Related Requirements:

1. Section 01 81 13 “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Section 03 30 00 "Cast-in-Place Concrete" for installing bearing plates in concrete.
3. Section 05 12 00 "Structural Steel Framing" for field-welded shear connectors.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Special Joists: Steel joists requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.5 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product indicated. Include product data for primer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data for Credit MR 4 and Credit MR 5: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.

    a. Include statement indicating costs for each product having recycled content.

C. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.

1. Comprehensive structural calculations of joists signed and sealed by the qualified professional engineer responsible for their preparation shall be submitted to the Architect and Structural Engineer for review prior to joist fabrication.
2. Shop drawings and structural calculations shall also be submitted to the Building Official for review as required.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications.

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of joists that are similar to those indicated for this Project in material, design and extent.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications.

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.

B. Unfinished Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.

C. Welding Electrodes: Comply with AWS standards.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.

1. Data given in ASD, service-load level unless otherwise noted.
2. Design joists to withstand design loads with live-load deflections no greater than the following:
   a. Roof Joists: Total load vertical deflection of L/360 of the span.
   b. Cantilevered Roof Joists or Top Chord Extensions: Vertical deflection of L/180 of the cantilevered length.

2.3 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.4 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications. Furnish additional erection bridging if required for stability.

C. Fabricate steel bearing plates from ASTM A 36 Steel bearing plates with integral anchorages are specified in Section 05 50 00 "Metal Fabrications."

D. Welding Electrodes: Comply with AWS standards.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.

C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

1. Space, adjust, and align joists accurately in location before permanently fastening.
2. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

3. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

3.4 PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2 or power-tool cleaning according to SSPC-SP 3.
2. Apply a compatible primer of same type as primer used on adjacent surfaces.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Steel Roof Decking
2. Acoustical Steel Decking.
3. Composite floor deck.

B. Related Sections include the following:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 03 Section "Cast-in-Place Concrete" for concrete fill.
3. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.
4. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Comply with requirements of Section 01 33 00.

B. Product Data: For each type of deck, accessory, and product indicated.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content data.

   a. Include statement indicating costs for each product having recycled content.

D. Shop Drawings: Show layout and types of deck panels, gauge, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, attachments, and rib closures, edge forms to other construction. Indicate temporary deck shoring, where required.

E. Product Certificates: For each type of steel deck, signed by product manufacturer.

F. Welding certificates.

G. Field quality-control test and inspection reports.

H. Research/Evaluation Reports: ICC Reports as evidence of steel deck's compliance with the International Building Code - 2012.

1.5 PERFORMANCE REQUIREMENTS

A. Shall conform to the General Notes on Structural Drawings.

B. Minimum deck gages are shown on the Drawings and are based on 3-span, unshored conditions. Heavier deck gages may be required for conditions other than these, depending on manufacturer's layout and contractor's layout. Deck supplier shall verify deck gages and capacities based on actual deck layout and span condition. Deviations in deck gages from those shown shall be submitted to the architect, along with a valid ICC report for approval, prior to shop detailing.

C. Sound Absorbing Metal Roof Decking: NRC rating of 0.85

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

B. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials: Provide steel decking of size, type, and quality as shown on the Drawings. Steel decking that is badly corroded or damaged in the opinion of the Inspector, shall not be incorporated in the Work. Steel decking materials shall conform to the Structural Drawings.

2.2 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Deck:

   a. ASC Profiles, Inc.
   b. Verco Manufacturing Co.
   c. Or approved Equal.

2.3 STEEL DECKING

A. Steel Roof Deck:

1. Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade per Drawings, zinc coating per Drawings.
3. Deck Type: Profile, type, and gauge as indicated on Structural Drawings.
4. Side Laps: As indicated on Structural Drawings.

B. Acoustical Steel Roof Deck: ASC Acustadek DGB-36AT

1. Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade per Drawings, zinc coating per Drawings.
3. Deck Type: Fully perforated. Profile, type, and gauge as indicated on Structural Drawings.
4. Side Laps: As indicated on Structural Drawings.
5. Insulation type: pre-cut unfaced rockwool batts
6. Coverboard: rockwool (NRC 0.85)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.4 COMPOSITE FLOOR DECK (ROOF R3)

A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

B. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade per Structural Drawings zinc coating per Structural Drawings.

C. Deck Type: Profile, type, and gage as indicated on Structural Drawings.

2.5 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

C. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength per Structural Drawings, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 30 for overhang and slab depth, unless indicated otherwise on drawings.

D. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

E. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

F. Galvanizing Repair Paint: ASTM A 780 or SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

G. Acoustic Insulation: as defined in product materials supplied by Acoustical Decking Manufacturer for acoustical system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Correct any conditions which are detrimental to the timely and proper completion of the work of this section. Do not proceed with work until unsatisfactory conditions are corrected.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:

1. Weld Diameter: 5/8- inch , nominal.
2. Weld Spacings as indicated on the Structural Drawings.
3. Weld Washers: Install weld washers at each weld location, where uncoated steel thickness is less than 0.028 inches.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or as shown on the Drawings, and as follows:

1. Fasten as indicated on Structural Drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches apart with at least one weld at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld.

3.4 COMPOSITE FLOOR DECK INSTALLATION

A. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: 5/8 inch, nominal.
2. Weld Spacing: Space and locate welds as indicated on structural drawings.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches, and as follows:

1. Fasten as indicated on structural drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Butted.

D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

1. Repair Galvanized Coating: Wire brush and clean rust spots, welds, and abraded areas on both surfaces (top and bottom) of galvanized deck immediately after installation, and apply repair paint.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior and Interior non-load-bearing wall framing.
2. Delegated design of non-load bearing framing

B. Related Requirements:

1. Section 01 81 13 “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes and connections used with cold-formed metal framing.
3. Section 09 29 00 "Gypsum Board" for interior non-load-bearing, metal-stud-framed, wall assemblies.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Cold-formed steel framing materials.
2. Interior non-load-bearing wall framing.
3. Vertical deflection clips.
4. Single deflection track.
5. Double deflection track.
6. Drift clips.
7. Post-installed anchors.
8. Power (Powder)-actuated anchors.
9. Sill sealer gasket.

B. Sustainable Design Submittals:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Comply with requirements of Section 01 81 13
2. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content data.
3. Include statement indicating costs for each product having recycled content.

C. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

D. Delegated-Design Submittal: For interior cold-formed steel framing.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of code-compliance certification for studs and tracks.

C. Product Test Reports: For each listed product, for tests performed by **manufacturer and witnessed by a qualified testing agency**.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

D. Research Reports:

1. For nonstandard cold-formed steel framing **post-installed anchors and power-actuated fasteners**, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
2. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified independent testing agency**, or in-house testing with calibrated test equipment,** indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of **the Steel Framing Industry Association**.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. AllSteel Products, Inc.
2. Clarkwestern Dietrich Building Systems LLC
3. SCAFCO Steel Stud Manufacturing Company.
4. Or Approved Equal.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: **As indicated and required for project location.**
2. Deflection Limits: Design interior framing systems to withstand **design loads** without deflections greater than the following:
   a. Interior Non-Load-Bearing Framing: Horizontal deflection of **1/240** of the wall height under a horizontal load of 5 lbf/sq. ft. (239 Pa).
   b. Ceiling Joist and Soffit Framing: Vertical deflection of 1/360 of the span.
3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
   a. Upward and downward movement of **1-1/2 inches (38 mm)**.

B. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:

1. Wall Studs: AISI S211.
2. Headers: AISI S212.
3. Lateral Design: AISI S213.

C. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 COLD-FORMED STEEL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

1. Grade: **As required by structural performance**.
2. Coating: **AZ50 (AZM150) or equivalent**.

B. Steel Sheet for **Vertical Deflection and Drift** Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: **As required by structural performance**.
2. Coating: **G90 (Z275)**.

2.4 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As required.
2. Flange Width: **1-5/8 inches (41 mm)**.
3. Section Properties: As required.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: **Matching steel studs**.
2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

C. Vertical Deflection Clips: Manufacturer's standard **bypass or head** clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Fire Rated walls: Provide ClarkDietrich BlazeFrame RipTRAK or equal

1. Ceiling runner with an offset shoulder that represents the thickness of the wall material. (5/8).

E. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: As required.
2. Flange Width: **1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications**.

F. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

    a. Minimum Base-Metal Thickness: As Required.
    b. Flange Width: **1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications**.

2. Inner Track: Of web depth indicated, and as follows:

    a. Minimum Base-Metal Thickness: As required..
    b. Flange Width: E**qual to sum of outer deflection track flange width plus 1 inch (25 mm)**>.

G. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, Bridging, and Solid Blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

B. Anchor Bolts: ASTM F1554, **Grade 55**, threaded carbon-steel **hex-headed bolts,** carbon-steel nuts, and flat, hardened-steel washers; zinc coated by **hot-dip process according to ASTM A153/A153M, Class C**.

C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

E. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: **SSPC-Paint 20**.

B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

E. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.8 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.

4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.

C. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

D. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 INSTALLATION OF INTERIOR NONLOADBEARING WALL FRAMING

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to **top and** bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: 16 – inches O.C. typical unless otherwise noted on Drawings.

C. Set studs plumb, except as needed for diagonal bracing.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated **on Shop Drawings** but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within **18 inches (450 mm)** of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

1. Install solid blocking at **96-inch (2440-mm) centers and at ceiling line**.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INSTALLATION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 REPAIR

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.7 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
2. Miscellaneous related items including fasteners, connectors, and other items required for complete installation of metal fabrication-type items.
3. Blocking and anchorage for Rooftop fall restraint system for personnel fall-restraint.
4. Metal bollards.
5. Shelf angles.
6. Steel bearing plates, weld plates and angles.
7. Miscellaneous steel trim.
8. Metal-Bar Grating
9. Crew Patio Gate and Screen
10. Trash Enclosure
11. Metal Awnings.
12. Steel Ladders.
13. Mechanical Screen
14. Four-Fold Door Pedestals

B. Products furnished, but not installed, under this Section:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Sections:

1. Division 01 Section "Submittal Procedures" for submittal requirements.
2. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Division 05 Section "Structural Steel Framing."
4. Division 06 Section “Interior Architectural Woodwork” for stainless steel counter tops as part of interior cabinetry and metal reinforced cabinet support structure.
5. Division 06 Sections for metal framing anchors.
6. Division 07 Section “Roof Accessories”.
7. Division 07 for aluminum roof ladders.
8. Division 09 Section ”Painting”

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

9. Division 10 "Miscellaneous Specialties" for stainless steel wire shelving units.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 ACTION SUBMITTALS

A. Submit under provisions of Section 01 3300.

B. Product Data: For the following:

1. Clips and anchorage devices for gratings.
2. Paint products.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13

D. Shop Drawings: Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

E. Templates: For anchors and bolts.

1.5 INFORMATIONAL SUBMITTALS

A. Mill Certificates: Signed by manufacturers of stainless steel certifying that products furnished comply with requirements.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
4. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. Provide materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Ferrous Metals: As required per structural general notes

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Wire Rod for Bar Grating Crossbars: ASTM A 510 (ASTM A 510M).

3. Steel Tubing: ASTM A 500, cold-formed steel tubing.

4. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

C. Nonferrous Metals:

1. Aluminum Extrusions: ASTM B 221, alloy 6063-T6.
2. Aluminum plates/sheets: ASTM B 209, alloy 6061-T6.
3. Aluminum Castings: ASTM B 26, Alloy 443.0-F.
4. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. General: Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

   a. Provide non-slotted fasteners.

2. Cast-in-Place Anchors in Concrete: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

3. Aluminum Items: Type 304 stainless-steel fasteners.

4. Copper-Alloy (Brass) Items: Silicon bronze (Alloy 651 or Alloy 655) fasteners where concealed, brass (Alloy 260 or 360) fasteners where exposed.
5. Stainless-Steel Items: Type 304 stainless-steel fasteners.

2.4 MISCELLANEOUS MATERIALS

A. Primer specified under this section is in addition to priming and painting applications specified under other sections.

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

1. Products:

   a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
   b. Carboline Company; Carbozinc 621.
   c. ICI Devoe Coatings; Catha-Coat 313.
   d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
   e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
   f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
   g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
   h. Or approved equal.

C. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint, compatible with paints specified to be used over it for regalvanizing welds in steel.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

F. Brazing Rods: For copper alloys, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.

G. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

2.5 FABRICATION

A. General: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
2. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
4. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
5. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 24 inches o.c.

B. Miscellaneous Framing and Supports: Provide steel framing and supports not specified in other Sections as needed to complete the Work. Fabricate units from steel shapes, plates, and bars of welded construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.

C. Miscellaneous Steel Trim: Fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Exterior Miscellaneous Steel Trim: Galvanize.

2.6 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 80 steel pipe.

B. Steel Finish: Hot-dipped galvanized; Field painting specified in Section 09 91 00.

C. Fill fixed metal bollards with concrete, minimum 3000 psi mix. (Remove any debris or water/ snow/ ice first.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.7 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates. – Field finish per 09 91 00 where exposed to view or the environment.

2.8 METAL-BAR GRATINGS

A. Metal-Bar Floor Grating – Galvanized Steel

1. Metal Bar-Grating: Form floor and exterior grating panels to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
2. Fabricate grating from welded steel grating with 1-by-1/8-inch bearing bars at 1-3/16 inch o.c. and crossbars at 4 inches o.c.; galvanized finish.
3. Products: Provide one of the following products subject to conformance with the requirements specified.
    a. "Welded Steel Grating – Type W19-4" – Grating Pacific Incorporated, Seattle, WA; 800/243-3939; website: gratingpacific.com
    b. Or approved Equal.

B. All metal-bar grating at floor locations to be removable.

C. Fasteners – Metal-Bar Gratings:

1. Saddle clips:
    a. Floor Locations: Provide gratings manufacturer's standard stainless steel saddle clips, and application- appropriate stainless steel screws, and related connectors to fasten grating sections to each other, and to stainless steel leveling shims placed under grating (resting on floor) to maintain gratings surface in level condition over sloping concrete floors.
    b. Exterior Locations: Provide gratings manufacturer's standard galvanized saddle clips, application- appropriate stainless steel screws, and related connectors to fasten grating sections to each other.
2. Do not damage floor or wall special coating system when installing gratings.

2.9 STEEL LADDER

A. General: Comply with ANSI A14.3, unless otherwise indicated.

B. Steel Ladders: Fabricate steel ladders from galvanized steel plates, and bars per construction documents

1. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
2. Finish: Field painted per section 09 91 00 for exterior galvanized metal. (All components including brackets and fasteners)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.10 FOUR-FOLD DOOR PEDESTALS

A. Fabricate metal pedestals from 3/16" steel tubing, as indicated.

B. Cap bollards with 1/4-inch thick steel plate.

C. Where bollards are indicated to receive push-button controls for door operators, photo eyes and power outlet, provide necessary cutouts for push-button controls and photo eyes, and holes for wire and wire access

D. Fabricate pedestals with 3/8-inch thick steel baseplates for bolting to concrete slab. Drill baseplates at all 4 corners for 1/2-inch anchor bolts.

E. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

F. Provide access for low voltage and power conduit per electrical.

G. Provide cover plate for wire access cutout.

H. Finish: Field painted per section 09 91 00 for interior ferrous metal.

2.11 CREW PATIO GATE AND SCREEN

A. Per Drawings.

B. Finish: Field painted per section 09 91 00 for exterior galvanized metal. (All components including brackets and fasteners)

2.12 TRASH ENCLOSURE

A. Per sheet Drawings.

B. Finish: Field painted per section 09 91 00 for exterior galvanized metal. (All components including brackets and fasteners)

2.13 MECHANICAL SCREEN

A. Per sheets drawings.

1. Finish: Field painted per section 09 91 00 for exterior galvanized metal. (All components including brackets and fasteners)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.14 ROOFTOP FALL-RESTRAINT SYSTEM

A. General - Provide fall protection anchors as indicated on drawings. See Section 07 72 00 Roof accessories for Rooftop Fall Restraint System.

B. Materials:

1. See structural details for required support and framing at each installed anchor point

C. Components - General:

1. See structural details for required support and framing at each installed anchor point based on proposed layout indicated on architectural drawings.
    a. Actual number of supports and location per delegated design of fall protection system
2. Fabricate of galvanized steel pipe, tube, plates and bars as detailed in structural drawings.
3. Separate dissimilar metals to prevent galvanic action.
4. Bolts and connecting hardware shall be made of stainless steel or hot dipped galvanized material

D. Finish: Hot-dipped galvanized; Field painted per section 09 91 00 for exterior galvanized metal. (All components including brackets and fasteners).

2.15 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Provide exposed fasteners with finish matching appearance, including color and texture.

D. Steel and Iron Finishes:

1. Hot-dip galvanize items as indicated to comply with ASTM A 123/A 123M or ASTM A 153/A 153M as applicable.
2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below for environmental exposure conditions of installed metal fabrications:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

3. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting," for shop painting.
4. Clean and prime all field welds prior to cover or field painting per section 09 91 00.
   a. All shop primed and galvanized materials to be painted, shall be primed and painted per section 09 91 00

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.

1. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
2. Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
3. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

B. Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack solidly with nonshrink, nonmetallic grout.

3.2 METAL BOLLARDS

A. Fixed Metal Bollards: Anchor bollards in place with concrete footings, as shown. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

1. Fill bollards solidly with concrete, mounding top surface to shed water with a uniform ¼ bowl shape.

B. Finish: Field painted per section 09 91 00 for exterior galvanized metal.

3.3 LADDERS

A. Ladder: Coordinate installation with framing and provide blocking as required. Anchor ladder in place, as shown.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Finish: Field painted per section 09 91 00 for exterior galvanized metal. (All components including brackets and fasteners).

3.4 INSTALLING METAL BAR GRATINGS

A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.

B. Attach removable units to supporting members with type and size of clips and fasteners indicated, as recommended by grating manufacturer for type of installation conditions shown.

C. Ensure adjacent work will not block or interfere with removal of the grate as required for future maintenance.

3.5 FALL-RESTRAINT SYSTEM

A. Coordinate with substrate framing, insulation, roofing and flashing work. Anchor securely to solid structure per structural drawings to resist required forces. Seal and flash to ensure a weather tight installation.

B. Verify Structure support and framing are in place prior to installation

3.6 CLEANING

A. Touch up surfaces and finishes after erection.

1. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.
2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Wood blocking and nailers.
2. Fire Retardant Plywood backing panels.

B. Related Sections include the following:

1. Division 01 Section "Submittal Procedures" for submittal requirements
2. Division 01 Section "Sustainable Design Requirements" for applicable Sustainability requirements.
3. Division 05 Section "Cold-Formed Metal Framing."
4. Division 06 Section "Sheathing."
5. Division 06 Section "Interior Architectural Woodwork"
6. Division 07 Section "Flexible Flashing"
7. Division 07 Section "Joint Sealants"

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 REFERENCES

A. American Forest & Paper Association

1. Details for Conventional Wood Frame Construction. 2001. (Available in PDF at www.awc.org)

B. American National Standards Institute (ANSI): 190.1 - Structural Glued Laminated Timber.

C. American Plywood Association (APA)

D. American Wood Preservers' Association: Book of Standards (AWPA).

E. International Conference of Building Officials (ICBO)

1. International Building Code (IBC) Chapter 23 Wood.

F. National Lumber Grading Authority of Canada (NLGA).

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Product Standard (PS): PS-20 - American Softwood Lumber Standard.

H. West Coast Lumber Inspection Bureau (WCLB): Standard Grading Rules for West Coast Lumber.

I. Western Wood Products Association (WWPA).

1.5 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NLGA: National Lumber Grades Authority.
2. WCLIB: West Coast Lumber Inspection Bureau.
3. WWPA: Western Wood Products Association.

C. SCL: Structural Composite Lumber

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
4. Chain-of-Custody Qualification Data: For manufacturer and vendor.
5. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.
6. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
7. Product Data: For installation adhesives, indicating VOC content.
8. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials. Retain paragraph below if applicable; delete if species and grade are indicated for each use.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

E. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Wood-preservative-treated wood.

1.7 QUALITY ASSURANCE

1.8 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER & PLYWOOD

A. AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

B. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

E. Application: Treat items indicated on Drawings, and the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Use only Borate treated pressure treated wood where in direct contact with concrete, masonry or near soil. Where the wood will be completely encapsulated and not in contact with concrete or masonry, use non-treated woods. Where other treated woods are utilized (such as copper treated woods), only stainless steel fasteners shall be utilized where penetrating and only stainless steel metal shall be in direct contact. All other metals should be separated from other treated woods as directed by the manufacturer.
2. Wood in contact with masonry or concrete.

F. Preservative Treatment by Pressure Process - Plywood:

1. Plywood: AWPA C9. Kiln dry after treatment to a maximum moisture content of 18 percent.
2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exterior, C-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
2. Where in contact with treated woods, use only stainless steel fasteners.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Use only expansion bolts listed in General Structural Notes

2.6 MISCELLANEOUS MATERIALS

A. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim. Coordinate with other trades to verify that blocking is installed

C. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

D. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

F. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

G. Sill Sealer: Install sill sealer gasket to form continuous seal between sill plates and

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. Testing: Prior to installation of insulation materials, framing shall be tested to verify that its moisture content does not exceed:

1. 10% where framing members are encapsulated by a spray foam insulation and a impermeable roofing membrane.
2. 15% where painted finish will be applied to wood surface.
3. 19% where framing members are not encapsulated as noted above.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Pressure-Treated Wood Furring to Receive Plywood: Install furring, providing sizes as indicated, where indicated on drawings.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior Gypsum Wall Sheathing.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submittal requirements
2. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Division 07 Section "Fluid-Applied Water Resistive Barriers" for water-resistive barrier applied over wall sheathing.
4. Division 09 Section “Gypsum Board” for interior gypsum products.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 ACTION SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Chain-of-Custody Qualification Data: For manufacturer and vendor.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.
4. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
5. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
6. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
7. Product Data: For installation adhesives, indicating VOC content.
8. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass-Mat Faced Gypsum Sheathing: ASTM C1177/C1177M

1. Type and Thickness: Type X, 5/8 inch thick.
2. Approved Product: Georgia-Pacific "DensGlass Sheathing", or approved Equal.

2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C1002.
2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C954.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
2. Structural Drawings.

D. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast

1. Contractor is responsible to provide weather protection as necessary to protect roof and wall sheathing from weather and keep in dry condition prior to application of cladding and roofing assemblies. Any unsuitable sheathing due to water penetration should be fully removed (in full sheets) and replaced with new.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with ASTM C1280, GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to metal framing with screws.
2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. See Structural for required fastener spacing
2. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels or as recommended by the gypsum sheathing manufacturer if not otherwise specified

D. Seal sheathing joints according to sheathing manufacturer's written instructions

E. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Plastic-laminate cabinets.
2. Cabinet Hardware
3. Countertops
4. Interior Window Sills, Stools and Aprons.
5. Acoustic Wood Panels (interior wood ceiling and wall acoustical panel system)

B. Related Sections include the following:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 01 Section "Submittal Procedures" for submittal requirements
3. Division 06 Section "Rough Carpentry" for blocking
4. Division 09 Section "Acoustical Panel Ceilings" for Acoustic Wood Panel suspended grid installation and acoustical cloud

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Exposed Surfaces of Cabinets: Surfaces visible when doors and drawers are closed, visible edges of cabinet ends, doors, drawer fronts and toe kicks not covered by base board. Excluding visible surfaces in open cabinets or behind glass doors.

B. Semi-exposed Surfaces of Cabinets: All surfaces visible when doors and drawers are open. Surfaces behind glass doors or drawer fronts, including interior faces of doors and interiors and sides of drawers. Visible surfaces in open cabinets and behind glass doors. Underside of wall cabinets and visible portions of cabinets from an upper building area."

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Concealed Surfaces of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets. Tops of wall cabinets and utility cabinets are defined as "concealed" unless visible from an upper building area.

1.5 QUALITY ASSURANCE

A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

B. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
2. Establish Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions are correspond to establish dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated."

1.8 SUBMITTALS

A. General: Conform with requirements under Division 01 Section "Submittal Procedures".

B. Product Data: For panel products, high-pressure decorative laminate, cabinet hardware and accessories, and finishing materials and processes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data:
    a. For recycled content, indicating postconsumer and preconsumer recycled content and cost.
    b. For adhesives, indicating that product contains no urea formaldehyde.
    c. For composite wood products, indicating that product contains no urea formaldehyde.
3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
4. Laboratory Test Reports:
    a. For adhesives, indicating compliance with requirements for low-emitting materials.
    b. For composite wood products, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.
4. Shop Drawings: For cabinets.
    a. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
    b. Show details full size.
    c. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
    d. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural wood cabinets.
    e. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
5. Shop drawings for Acoustic wood panel ceilings and wall systems:
    a. Showing coordination of ceilings and wall system including details and attachment systems.
    b. Coordinate ceiling and wall panel layout and installation with suspension systems components in section 09 51 13
    c. Show other construction elements, light fixtures, HVAC equipment, fire – suppression systems, and other assemblies that may impact installation.

E. Samples for Verification:

1. Plastic laminates and Fiber-composite Board
    a. 8 by 10 inches, for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
    b. Corner pieces as follows:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1) Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
2) Miter joints for standing trim.

c. Exposed cabinet hardware and accessories, one unit for each type and finish.

2. Solid surfacing materials
3. Thermo-set decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish, with edge banding on 1 edge.
4. Wood ceilings and wall panel systems

F. Warranty and maintenance information to be included in closeout manuals:

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. Medium-Density Fiberboard: ANSI A208.2, Industrial Grade MDF, made with binder containing no urea formaldehyde. Basis of Design: For all laminated cabinet work substrate (unless otherwise noted), Provide "Medite II" as manufactured by SierraPine Springfield, Oregon or equivalent product in compliance with requirements. 100% post-industrial recycled wood residuals with formaldehyde-free adhesive system; meeting the following characteristics:

a. Surface Burning Characteristics: Flame spread Class C rating; ASTM E 84.
b. Screw Holding Face: 300 lbs
c. Screw Holding Edge: 245 lbs
d. Density: Not less than 40 pounds per cu foot..
e. Water Absorption: 6.5 percent average, 24 soak.

2. Plywood: DOC PS 1; Exterior Grade A-C plugged (Marine Grade where noted)

C. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

1. Manufacturer – Basis of Design: Subject to compliance with requirements, provide high-pressure decorative laminates by Formica.

2. Type: Standard type, unless Special Purpose type is indicated.
3. High-Pressure Decorative Laminate Grades: AWI and WI standards require minimum thickness of 0.028 inch (0.7 mm) regardless of surface type.

a. Grade HGS is 1.2 mm thick.
b. Grades HGL and HGP are 1.0 mm thick.
c. Grade VGS is 0.7 mm thick.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Colors and Patterns: Architect will select from manufacturer's full range of colors, patterns and textures as many as seven (7) different laminates of distinct color, texture and pattern including as many as (3) premium, wood grain and/or metallic laminates.

D. Solid Surfacing:

1. Manufacturer – Basis of Design: Subject to compliance with requirements, Solid Surface Acrylic Resin by Wilson Art LLC or comparable product:

a. Tensile Strength: [6800 psi]; ASTM D 638.
b. Tensile Modulus: [1.5 x 10^6 psi]; ASTM D 638.
c. Tensile Elongation: 0.4 percent minimum; ASTM D 638.
d. Flexural Strength: [10,000 psi]; ASTM D 790.
e. Flexural Modulus: [1.5 x 10^6 psi]; ASTM D 790.
f. Thermal Expansion Coefficient: 1.37 x 10^5 in./in.^{o}F; ASTM D 696.
g. Hardness (Barcol Impressor): 55-62; ASTM D 2583.
h. Impact Resistance: [144 in.] drop with no fracture; NEMA LD-3, Method 3.8.
i. Izod Impact: 0.28 (ft-lb.)/in.; ASTM D 256, Method A.
j. Light Resistance - Xenon: No effect; NEMA LD-3, Method 3.3.
k. Stain Resistance: Pass; ANSI Z 124.3, modified.
l. Wear and Cleanability: Pass; ANSI Z 124.3.
m. Fungi Resistance: Pass; ASTM G 21.
n. Bacterial Resistance: Pass; ASTM G 22.
o. Boiling Water Resistance: No effect; NEMA LD-3, Method 3.5.
p. High Temperature Resistance: No effect; NEMA LD-3, Method 3.6.
q. Weatherability: Delta E less than 5; ASTM G 155.
r. Moisture Absorption: Less than 0.25 percent; ASTM D 570, long term.
s. Specific Gravity: [1.7 gram/cm^3]; ASTM D 792.
t. Weight: [4.4 lb./ft^2].
u. Surface Burning Characteristics: Class I and Class A; ASTM E 84.

2. Finish: As selected by architect from approved samples.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for items specified in Division 08 Section "Finish Hardware".

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 120 degrees of opening, self-closing.

C. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter, stainless steel finish.

D. Catches: Magnetic catches, BHMA A156.9, B03141.

E. Drawer Slides: BHMA A156.9, B05091.

1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
3. File Drawer Slides: Grade 1HD-200; for drawers more than 6 inches high or 24 inches wide and slide out shelves

F. Clothes Rod:

1. 1-1/2" diameter, stainless steel, typical.
2. 1-1/16" diameter, chrome plated steel tube at wardrobe cabinets.
3. Flanges and End caps: Chrome-look compatible with steel tubing

G. Grommets: 2" diameter for cords vinyl with removable cap.

1. Color: As selected from manufacturer's standard colors.

H. Shelf Pins: All shelf pins to be seismic double pin captive shelf support.

I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

J. Support Brackets:

1. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: CounterBalance Conceled Bracket (1 inch), http://www.counterbalanceshop.com, or equal.
   a. Model No.: CCH-CBCBM-24WH.
      1) Size: 24 inch at 30-inch counters.
   b. Model No: CCH-CBCBM-18WH
      1) Size: 18 inch at 24-inch desktops and counters.
   c. Model No.: CCH-CBCBM-12WH.
      1) Size: 12 inch at 12 and 14 inch shelves.
2. Hot rolled 1/8 inch steel with powder coated finish.
3. Support Placement: Every 16 inches to 20 inches.
4. Color: A or s selected by Architect.

2.3 ADHESIVES, SEALANTS AND ACCESSORIES

A. General: Use only adhesives formulated for stone and recommended by their manufacturer for the application indicated.

B. Color: Match stone. As per sample.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Sealant for Countertop: Manufacturer's standard sealant of characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants" and will not stain the stone it is applied to.

1. Single-component, neutral-curing silicone sealant.
2. Color: Custom color matched and approved by architect.

D. Do not use adhesives that contain urea formaldehyde.

E. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the more restrictive following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. That comply with the requirements od section 01 81 13, "Sustainable Design Requirements

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

C. Metal Reinforced Support Structure:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Steel Tubing: ASTM A 500, cold-formed steel tubing.

2.5 PLASTIC-LAMINATE CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cabinets:

a. Classic Fixtures, Inc
b. Custom Source Woodworking, Inc
c. Genothen
d. SH Fine Wood Products, Inc.
e. Pacific Cabinets, Ferdinand, ID.
f. Valley Cabinets
g. AAA Cabinets & Millwork
h. Or approved Equal

B. Grade: Premium.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. AWI Type of Cabinet Construction: Flush overlay.

D. Laminate Cladding for "Exposed Surfaces":

1. High-pressure decorative laminate complying with the following requirements:

a. Countertops: Grade HGS 1.2 mm thick.
b. Horizontal Surfaces Other Than Countertops: Grade HGL 1.0 mm thick.
c. Vertical Surfaces: Grade VGS 0.7 mm thick..
d. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish as selected by architect unless otherwise noted
e. Cabinet Door and Drawer Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish as selected by architect.

E. Materials for "Semi-exposed Surfaces":

1. All Semi-exposed Surfaces (except as noted below): High-pressure decorative laminate, Grade VGS, 0.7 mm thick..

a. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish as selected by architect, unless otherwise noted.

2. Interior surfaces not seen when cabinet doors are closed excluding back of door: Thermoset decorative panels (Melamine).

a. Edges: PVC edge banding, 0.12 inch (3 mm) thick, color, pattern, and finish as selected by architect from full line of edging.

3. Drawer Body Sides and Backs and Bottom: Thermoset decorative panels (Melamine).

a. Edges: PVC tape 0.018 inch thick edge banding, matching Thermoset facing in color, pattern, and finish.

4. Adjustable Shelves behind Doors: Thermoset decorative panels (Melamine) color, as selected by architect.

a. Edges: PVC edge banding, 0.12 inch (3 mm) thick, color, pattern, and finish as selected by architect from full line of edging.

F. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

G. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Colors and Patterns: As selected by Architect from manufacturer's full range of color including standard and premium laminate.

2.6 GENERAL PLASTIC-LAMINATE COUNTERTOPS FABRICATION

A. Grade: Premium.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. High-Pressure Decorative Laminate Grade: HGS .

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from manufacturer's full range of standard and premium laminates in the following categories:

a. Solid colors, gloss or matte finish.
b. Wood grains, gloss or matte finish.
c. Patterns, gloss or matte finish.

D. Grain Direction: Parallel to cabinet fronts.

E. Edge Treatment: PVC edge banding, 0.12 inch (3 mm) thick, color, pattern, and finish to match countertop as selected by architect from full line of edging.

F. Backer Sheet: Provide plastic-laminate backer sheet, Grade BKL, on underside of countertop substrate.

G. Paper Backing: Provide paper backing on underside of countertop substrate.

2.7 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Grade: Premium

B. Solid-Surfacing-Material Thickness: **1/2 inch** (13 mm).

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

1. As selected by Architect from manufacturer's full range.

D. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

1. Fabricate tops with shop-applied edges of materials and configuration indicated.
2. Fabricate tops with loose backsplashes for field application.
3. Drill holes in countertops for plumbing fittings and soap dispensers in shop.
4. Fabricate for installation of undermount sink where occurs.

2.8 WINDOW SILL, STOOL AND APRON

A. Grade: Premium.

B. High-Pressure Decorative Laminate Grade: HGS .

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from manufacturer's full range of colors and textures including standard and premium laminates in the following categories:

a. Solid colors, gloss or matte finish.
b. Wood grains, gloss or matte finish.
c. Patterns, gloss or matte finish.

D. Grain Direction: Parallel to wall.

E. Edge Treatment: Same as laminate cladding on horizontal surfaces.

F. Core Material: Exterior grade plywood, unless otherwise noted

2.9 ACOUSTIC WOOD PANELS

A. Exterior Ceiling:

1. Product: 2100 Panelized Linear

a. Style: 2100 style cross piece grille 2114-3
b. Edge Profile: Square
c. Species: PEFC Western Hemlock - for interior and exterior use. solid, clear, mixed grain
d. Size: 5/8 x 3 ¼ with 3 Members per LF. in 12" wide panel
e. Reveal/Spacing: 3/4"
f. Finish: Clear pre-catalyzed lacquer with satin sheen. Stain to match architect's control sample
g. Assembly Style: Cross Piece Backer - Black

2. Provide with insect screen.
3. Provide direct mount metal safety clips
4. Provide for (1) fabricated access panel for soffit area.

a. Locate per architect's direction

B. Interior Ceiling:

1. Product: 1100 S Wood Grille

a. Style: 1100 style cross piece grille 1114-6
b. Edge Profile: Square
c. Species: PEFC Western Hemlock - solid, clear, mixed grain
d. Size: 3/4" X 3-1/4" (Net) 6 members / LF. in 12" wide panel
e. Reveal/Spacing: 1 3/4"
f. Finish: Clear pre-catalyzed lacquer with satin sheen. Stain to match architect's control sample
g. Assembly Style: Cross Piece Backer - Black

2. Provide for (1) fabricated access panel for each separate ceiling area. (5) total

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Locate per architect's direction

C. Wall product

1. Product: 1100 S Wood Grille

a. Style: 1100 style cross piece grille 1114-6
b. Edge Profile: Square
c. Species: PEFC Western Hemlock - solid, clear, mixed grain.
d. Member Size: 3/4" X 3-1/4" (Net) 6 members / LF. in 12" wide panel
e. Reveal/Spacing: 1 3/4"
f. Finish: Clear pre-catalyzed lacquer with satin sheen. Stain to match architect's control sample
g. Assembly Style: Cross Piece Backer - Black

2. Provide direct mount metal safety clips

2.10 FABRICATION, GENERAL

A. Interior Woodwork Grade: Unless otherwise indicated, provide Premium-grade interior woodwork complying with referenced quality standard.

B. Verification of Dimensions: Verify all approved appliance sizes prior to fabrication of cabinetwork, to avoid conflict.

C. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

D. Fabricate woodwork to dimensions, profiles indicated on drawings and in these specifications.

E. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets.

F. Provide valance at wall cabinets with under cabinet light fixtures and as indicated on drawings.

G. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.11 SOLID SURFACE COUNTERTOP FABRICATION, GENERAL

A. Fabricate components in shop, to greatest extent practicable, in sizes and shapes indicated according to approved shop drawings and Wilsonart published fabrication requirements.

B. Form joint seams between solid surfacing components with specified seam adhesive. Completed joints inconspicuous in appearance and without voids. Provide joint reinforced if required by manufacturer for particular installation conditions.

C. Cutouts and Holes:

1. Undercounter and Deck mounted Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify proper blocking and supports are installed prior to beginning fabrication.

B. Field measure and verify measurements prior to fabrication.

C. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

D. Install woodwork in conformance to details on drawings, level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

E. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Unless noted otherwise in these specifications, anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Cabinets and Countertops: Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.

H. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into sheet metal wall strip backing.

I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop, and supplementary attachment by use of mastic adhesive as recommended by the countertop materials manufacturers.

1. Seal edges of cutouts by saturating with varnish
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

4. Secure backsplashes to walls with adhesive.
5. Caulk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants." Color to match laminate.

J. Solid Surface Countertop Installation

1. Install solid surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Use woodworking and specialized fabrication tools acceptable to manufacturer.
2. Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.
3. Provide minimum 1/2 inch radius for countertop inside corners.
4. Fill gaps between countertop and terminating substrates with specified silicone sealant.
5. Install undermount sink units to countertops with specified adhesives and mechanical fastener's per manufacturer's requirements.
6. Install backsplashes and endsplashes where indicated on Drawings. Adhere to countertops with specified construction adhesive.
7. Vanities: Secure front panels to solid substrate with specified construction adhesive. Maintain 1/16 inch gap between fixed and removable panels.

    a. ADA Vanities: Angled front panel to permit wheelchair access to comply with referenced accessibility standard.

K. Acoustic Wood Panels: Generally install per manufactures' written and approved installation instructions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

L. Install Acoustic Wood ceiling and wall panels in accordance with manufacturer's installation instructions and in compliance with all local codes and regulations. Install with undamaged edges and fitted accurately to suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit, as required.

M. Suspension Runners: Install suspension system runners per section 09 51 13 so they are square and securely interlocked with one another. Install number and use on-center spacing per Acoustic Wood Panel manufacturer's instructions, as indicated on approved Shop Drawings and in compliance with all local codes.

N. Direct Mount Safety Clips: Install direct mount safety clips straight and square to allow a flush, plumb installation. Install number and use on-center spacing per Acoustic Wood Panel manufacturer's instructions, as indicated on approved Shop Drawings and in compliance with all local codes.

O. Pre-drill screw holes of horizontal cross members slightly smaller than screw width to prevent wood members from splitting.

P. Paint exposed screw heads black to match backing members.

3.2 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets and countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

C. Sealer Application: Apply solid surface counter sealer to comply with manufacturer's written instructions.

D. For wood ceiling and wall system assemblies, clean exposed wood surfaces and comply with manufacture's instructions for cleaning and touchup of minor finish damage. Remove and replace wood ceiling components that cannot be successfully clean and repaired to permanently eliminate evidence of damage.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Modified bituminous sheet waterproofing.

B. Related Sections:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site.**

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

C. Samples: For each exposed product and for each color and texture specified, including the following products:

1. 8-by-8-inch (200-by-200-mm) square of waterproofing and flashing sheet.
2. 4-by-4-inch (100-by-100-mm) square of drainage panel.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: **Five** years from date of Substantial Completion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Waterproofing System: Obtain waterproofing materials **molded-sheet drainage panels** from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Minimum 60-mil (1.5-mm) nominal thickness, self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated on one side to a 4-mil- (0.10-mm-) thick, polyethylene-film reinforcement, and with release liner on adhesive side[**; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction**].

1. Products: subject to compliance with requirements, provide one of the following:
   a. CETCO Building Materials Group; Envirosheet.
   b. American Permaquik Inc.; PQ 7100.
   c. Carlisle Coatings & Waterproofing Inc.; CCW MiraDRI 860/861.
   d. Grace, W. R. & Co.; Bituthene 3000.
   e. Henry Company; Blueskin WP 200.
   f. Or approved equal.

2. Physical Properties:

   a. Tensile Strength, Membrane: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
   b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
   c. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970/D 1970M.
   d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3-mm) movement; ASTM C 836/C 836M.
   e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154/E 154M.
   f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
   g. Water Vapor Permeance: 0.05 perm (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.
   h. Hydrostatic-Head Resistance: 150 minimum; ASTM D 5385.

3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Primer: Liquid **waterborne** primer recommended for substrate by sheet-waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm), predrilled at 9-inch (229-mm) centers.

G. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on **one side** with plastic film, nominal thickness 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) per ASTM D 1621, and maximum water absorption by volume of 0.6 percent per ASTM C 272/C 272M.

2.4 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 15 **gpm per ft. (188 L/min. per m**.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of **1/16 inch (1.6 mm)**.

F. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

1. Install membrane strips centered over vertical inside corners. Install 3/4-inch (19-mm) fillets of liquid membrane on horizontal inside corners and as follows:

a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

G. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F (16 deg C).

D. Two-Ply Application: Install sheets to form a membrane with lap widths not less than 50 percent of sheet widths, to provide a minimum of two thicknesses of sheet membrane over areas to receive waterproofing.

E. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

G. Seal edges of sheet-waterproofing terminations with mastic.

H. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.

I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches (150 mm) beyond repaired areas in all directions.

J. Immediately install protection course with butted joints over waterproofing membrane.

1. **Molded-sheet drainage panels** may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.4 MOLDED-SHEET DRAINAGE-PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. For vertical applications, install **protection course** before installing drainage panels.

3.5 INSULATION DRAINAGE-PANEL INSTALLATION

A. Install insulation drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.

D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.

B. Waterproofing will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.7 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes penetrating water-repellent coatings for the following vertical and horizontal surfaces:

1. Exterior face of concrete building walls.
2. Exposed, unpainted exterior concrete retaining walls, patio, generator/dumpster slabs and equipment pads.
3. Exposed, unpainted exterior masonry at building exterior.
4. Exposed, unpainted interior masonry.

B. Related Sections include the following:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 03 Section "Cast in Place Concrete"

4. Division 07 Section "Joint Sealants."
5. Division 09 painting Sections for paints and coatings.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PERFORMANCE REQUIREMENTS

A. Performance Testing: Provide water repellents that comply with test-performance requirements indicated, as evidenced by reports of tests performed by manufacturer by a qualified independent testing agency on manufacturer's standard products applied to substrates simulating those on Project using same application methods to be used for Project.

1. Notify Architect seven days in advance of the dates and times when assemblies will be constructed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Absorption: Minimum 90 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens.

1. Hardened Concrete: ASTM C 642.

C. Water-Vapor Transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E 96.

D. Permeability: Minimum 90 percent water-vapor transmission in comparison of treated and untreated specimens, per ASTM D 1653.

E. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per ASTM G 154.

F. Chloride-Ion Intrusion in Concrete: NCHRP Report 244, Series II tests.

1. Reduction of Water Absorption: 85 percent.
2. Reduction in Chloride Content: 90 percent.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of product indicated.

1. Include manufacturer's printed statement of VOC content.

2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data: For sealants and coatings, indicating VOC content.
3. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
4. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

D. Samples: For each type of water repellent and substrate indicated, 12 by 12 inches in size, with specified water-repellent treatment applied to half of each Sample.

E. Manufacturer Certificates: Signed by manufacturers certifying that water repellents comply with requirements.

F. Qualification Data: For Installer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 548 for testing indicated.

C. Test Application: Apply a finish sample for each type of water repellent and substrate required. Duplicate finish of approved sample.

1. Locate each test application as directed by Architect.
2. Size: 10 sq. ft..
3. Final approval by Architect of water-repellent application will be from test applications.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Ambient temperature is above 40 deg F.
2. Concrete surfaces have cured for more than 28 days.
3. Concrete walls are not treated prior to 30 days after building close-in.
4. Rain or snow is not predicted within 24 hours.
5. Application proceeds more than 24 hours after surfaces have been wet.
6. Substrate is not frozen, or surface temperature is above 40 deg F.
7. Windy conditions do not exist that may cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in Part 1 "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 PENETRATING WATER REPELLENTS

A. Concrete Surfaces - Silane, Penetrating Water Repellent: Clear, monomeric compound containing 40 percent or more solids of alkyltrialkoxysilanes; with alcohol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L (5 lb/gal) or less of VOCs.

1. Available Products:

a. BASF Construction Chemicals, LLC; Enviroseal 40, Hydrozo 100
b. Evonik Industries, "Protectosil CHEM-TRETE PB VOC".
c. Or approved Equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to water-repellent manufacturer's written instructions, to ensure that surface is dry enough.

1. Cast-in-Place Concrete: Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of water repellents.

B. Test for pH level, according to water-repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.

C. Protect all adjoining work, including sealant bond surfaces, from spillage, drips or blow-over of water repellent or if there is the possibility of water repellent being deposited on surfaces. Including but not limited to:

1. Cover all metal surfaces
2. Cover adjoining and nearby surfaces of aluminum and glass
3. Cover live plants and grass.

D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Concrete: Apply a heavy-saturation spray coating of water repellent on surfaces using low-pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated.

C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.3 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Concealed building insulation.
   a. High Density Thermal Insulation (Fiberglass or Mineral wool - at contractor's option)
      1) Exterior walls and ceiling
      2) Walls between Apparatus Bays and other spaces
   b. Extruded Polystyrene (XPS) Rigid Insulation
      1) Under Slab insulation
   c. Spray Polyurethane Foam Insulation
   d. Mineral Wool board insulation
2. Vapor Retarders
3. Firestop Mineral Wool
4. Protection of exterior building openings.

B. Related Sections include the following:

1. Division 01 Section "Sustainable Design Requirements" for applicable Sustainability requirements.
2. Division 01 Section "Quality Requirements" for Building Envelope Consultant.
3. Division 03 Section "Cast-in-Place Concrete" for under slab vapor retarder.
4. Division 05 "Steel Decking" for insulation associated with acoustic metal deck system.
5. Division 05 "Cold Formed Metal Framing."
6. Division 06 Section "Rough Carpentry" for wood moisture content requirements.
7. Division 07 Section "Weather and Air Barrier" for Building Air Barrier (blower door) testing.
8. Division 07 Section "Polyvinyl-Chloride (PVC) Roofing" for insulation, cover board and vapor & air barrier specified as part of roofing and deck system.
9. Division 07 Section "Metal Roof Panels" for insulation, cover board and vapor & air barrier specified as part of roofing and deck system.
10. Division 07 Section "Rainscreen Attachment System" attachment of mineral wood board insulation
11. Division 09 Section "Gypsum Board" assemblies for sound attenuation blankets.
12. Mechanical Sections "Duct Insulation," Equipment Insulation," and "Pipe Insulation."

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of product indicated.

C. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data:
    a. For recycled content, indicating postconsumer and preconsumer recycled content and cost.
    b. For adhesives, indicating VOC content.
3. Laboratory Test Reports:
    a. For adhesives, indicating compliance with requirements for low-emitting materials.
    b. For insulation, indicating compliance with requirements for low-emitting materials.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source.

B. Preinstallation Meeting: Contractor to conduct conference at project site

1. Attendance: Meet with Owner, Owner's Building Envelope Consultant, Architect, metal roof panel Installer, and installers whose work interfaces with or affects metal wall panels.
2. Meeting Time: Minimum 3 weeks prior to prior to beginning work of this Section and work of related Sections affecting work of this Section.
3. Location: Project Site.

C. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Surface-Burning Characteristics: ASTM E 84.

2. Fire-Resistance Ratings: ASTM E 119.

3. Combustion Characteristics: ASTM E 136.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. High Density Glass-Fiber Insulation:

   a. CertainTeed Corporation.
   b. Johns Manville Corporation
   c. Owens Corning
   d. Knauf Insulation
   e. Or Approved Equal.

2. Unfaced, Mineral-Wool Blanket Insulation

   a. Roxul - comfort batts
   b. ThermaFiber - FS-15
   c. Johns Manville Corporation - TempControl Batts
   d. Or Approved Equal

3. Extruded-Polystyrene Board Insulation:

   a. Dow Chemical Company
   b. Owens Corning.
   c. DiversiFoam Products
   d. Tenneco Building Products.(KingSpan)
   e. Or Approved Equal

4. Spray Polyurethane Foam Insulation

   a. BASF Spraytite Comfort Plus Series
   b. Demilec Heatlok HFO Pro
   c. Or Approved Equal

5. Mineral Wood Board Insulation

   a. RainBarrier 45 by Thermafiber, http://www.thermafiber.com.
   b. Fibrex Insulations Inc., http://www.fabricationspecialties.com.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

c. Roxul Inc., http://www.roxul.com.
d. Or Approved Equal.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
2. Identification mark shall be applied to all insulation materials.

B. Glass-Fiber Blanket Insulation (Unfaced): ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

a. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.

2. Insulative values:

a. Exterior Walls: R-3.8/inch minimum.

C. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers from slag or rock wool; passing ASTM E 136 for combustion characteristics; with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Insulative values:

a. Exterior Walls: R-4/inch minimum.

D. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Type IV, 20 psi.
2. 2” thickness, R-10 unless otherwise indicated on drawings.

E. Spray Polyurethane Foam Insulation

1. Hydrophobic, low-density, closed-cell modified insulation:

a. Thermal Resistance (R-Value/inch @75 deg F): ASTM C 518; 6.6 hr/sq ft/degree F/BTU
b. Air Permeance (for 2 inches of material): ASTM E 2178; < 0.014 L/s.m^2 @ 75 Pa
c. Water Vapor Transmission (for 5.5 inches of material): ASTM E 96; 0.55 perms [627 ng /(Pa.s.m^2)]
d. Flame Spread and Smoke Developed Rating: ASTM E 84

1) Flame Spread: Less than 25

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2) Smoke Development: Less than 450

e. Bacterial and Fungal Growth and Food Value: ASTM C 1338: no growth

f. Product Description:

1) ICC/ES Evaluation Report No. ESR 1826

2. Thickness: As shown in drawings

F. Metal Deck Flute Insulation: ASTM 726; FM approvals 4470 NCC mineral wool fiber metal deck flute filler manufactured from basalt rack and steel slag having a melting point of approximately 2150 deg F.

1. Actual density ASTM C 303: 12.5 lb/ft^3 (200 kg/m^3)
2. Dimensional Stability ASTM D2126: Linear shrinkage 7 days @ 40 deg F (-40 deg C): 0.00%
3. Moisture Resistance ASTM C209: Water absorption <1.0%
4. Fire Resistant

2.3 MINERAL-WOOL BOARD INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Semi-Rigid Board Insulation: Subject to compliance with requirements. Provide comparable products by one of the following available manufacturers:

1. RainBarrier 45 by Thermafiber, http://www.thermafiber.com.

2. Fibrex Insulations Inc., http://www.fabricationspecialties.com.

3. Roxul Inc., http://www.roxul.com.

4. Or equal.

C. Unfaced, Mineral-Wool Board Insulation: ASTM C612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics.

1. Nominal density of 4.5 pounds per cubic foot2016. Types IA and IB.

2. Thermal Resistivity: R-4.2 per inch.

3. Insulative Values: 2 inches and 4 inches

2.4 FIRESTOP MINERAL WOOL

A. Basis of Design: Mineral Wool (4PCF) 46”x24”x4” by Hilti

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.5 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates and successive layers of insulation indicated without damaging insulation and substrates.

B. Vapor Retarder ("Vapor Barrier" on Drawings):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Raven Industries, Inc.
   b. Reef Industries, Inc.
   c. Or approved equal.

2. Polyethylene Vapor Retarders: ASTM D4397, **6-mil- (0.15-mm-)** thick sheet, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).
3. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders at conditions where vapor retarder is exposed.
   a. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than **20 lb/1000 sq. ft. (9 kg/100 sq. m)**, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).
      1) Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 200, respectively, per ASTM E84.

C. Vapor-Retarder Adhesive Primer: For self-adhesive Roof Vapor Retarders Provide manufacturer's water based adhesive primer suitable for weather conditions and sub-base material.

D. Vapor-Retarder Adhesive: Where approved by Architect or recommended by manufacturer, provide adhesive of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.6 INSULATION FASTNERS

A. Batt Insulation: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Wire insulation support.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation means applicator accepts existing conditions.

3.2 PROTECTION OF EXTERIOR BUILDING OPENINGS

A. All exterior building openings must be protected to prevent moisture infiltration into the building. Protection shall be secured to the outside of the building and shall be tear resistant as appropriate for the designed wind loads. Edges of protection shall be sealed to prevent wind driven moisture.

1. Exception: If contractor has installed all required exterior doors, windows, louvers and storefronts, additional opening protection is not required.

3.3 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.4 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids completely with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required and approved by architect, to make up total thickness.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

A. Install glass-fiber or mineral wool blankets in cavities formed by framing members according to the following requirements:

1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
    a. While friction fit is required per above, all insulation is to be attached to framing so insulation is not reliant on friction alone to stay in place.
3. Provide mechanical anchorage or wire supports to provide permanent placement and support of units where insulation is not covered on one or both sides.
4. Provide wire supports to provide permanent placement of insulation where framing is either not available or spacing prevents fitting between framing.

B. Installation of Below Grade insulation: (Extruded Polystyrene)

1. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
    a. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line.
2. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
    a. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) in from exterior walls.

C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation and as indicated on the Drawings using the following materials:

1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.6 INSTALLATION OF VAPOR RETARDERS

A. General: Place vapor retarder on interior side of construction unless otherwise indicated on drawings. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates.

B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs.

C. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.

E. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor-retarder manufacturer's instructions.

F. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

G. Seal overlapping joints in vapor retarders at all intersecting planes with adhesives or vapor-retarder tape according to vapor-retarder manufacturer's instructions. Locate all joints over framing members or other solid substrates.

H. Firmly attach vapor retarders to substrates with mechanical fasteners as recommended by vapor-retarder manufacturer.

I. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

J. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.7 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.8 SCHEDULE

A. Thermal Insulation (Fiberglass or Mineral wool- at contractor’s option)

1. Fire Station: All exterior walls, interior walls between the apparatus bays and adjacent spaces, walls at areas noted on plan.

B. Extruded-Polystyrene Board Insulation:

1. Fire Station: At perimeter as indicated on the Drawings.

C. Spray Foam Insulation:

1. Fire Station: Walls and roof areas noted on the Drawings and at miscellaneous voids.

D. Mineral Wool Board Insulation

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. 2" at exterior face of sheathing located at 10" stud walls
2. 4" at exterior face of sheathing located at 6" stud walls

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes Fluid-applied Water Resistive (and Air) Barriers and accessories including liquid flashing, joint and seam filler, and air barrier sealants.

B. Related Sections:

1. Section 01 40 00 “Quality Requirements” for Building Envelope Consultant.
2. Section 01 81 13 “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Section 06 16 00 "Sheathing" for wall sheathing.
4. Section 07 65 00 "Flexible Flashing" for Self-adhesive flexible flashing.
5. Section 07 92 00 "Joint Sealants".

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review water resistive barriers and accessories requirements and installation, special details, mockups, bond testing, product protection, and work scheduling.

1.5 SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. "Product Data for Credit IEQ 4.2" Subparagraph below applies to LEED-NC and LEED-CS.
3. Product Data for Credit IEQ 4.2: For weather barrier products, documentation including printed statement of VOC content.
4. "Laboratory Test Reports for Credit IEQ 4" Subparagraph below applies to LEED for Schools.
5. Laboratory Test Reports for Credit IEQ 4: For weather barriers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: For water resistive barriers and accessories.

1. Show locations and extent of water resistive barriers and accessories. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
2. Include details of interfaces with other materials.

D. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.

E. Product Certificates: From water resistive barrier and accessories manufacturer, certifying compatibility of water resistive barriers and accessory materials with Project materials that connect to or that come in contact with the products.

F. Test Reports: Air Barrier (Blower door) test results performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by the manufacturer.

1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly of size and location adequate to incorporate backup wall construction, external cladding, window, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of water resistive barriers and accessories, and sealing of gaps, terminations, and penetrations of water resistive barrier assembly.

a. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply water resistive barriers and accessories until mockups are approved.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle water resistive barrier and accessories materials according to manufacturer's written instructions.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply water resistive barrier and accessories within the range of ambient and substrate temperatures as recommended in writing by water resistive barrier manufacturer.

1. Protect substrates from environmental conditions that affect water resistive barrier performance.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary water resistive barrier and accessories materials from a single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: fluid-applied water resistive barriers shall be capable of performing as a continuous water resistant, vapor permeable weather barrier and as a liquid-water drainage plane flashed to discharge to the exterior, incidental condensation or water penetration. Water resistive barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 FLUID APPLIED WATER RESISTIVE BARRIERS (Noted WRB, Weather Air Barrier, WRB/AB, WAB on drawings)

A. Basis of Design: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. At openings, inside corners at HPL panels or where visible from the exterior without cladding, flashing or trim - black.
    a. PROSOCO R-GUARD CAT 5 Rain Screen, manufactured by PROSOCO, Inc. or approved equal.
    b. Product is a single component, Silyl-Terminated-Polymer (STP) fluid applied, waterproofing, and air and water barrier membrane.
2. At all other locations.
    a. PROSOCO R-GUARD CAT 5, manufactured by PROSOCO, Inc. or approved equal.
    b. Product is a single component, Silyl-Terminated-Poly-Ether (STPE) fluid applied, waterproofing, and air and water barrier membrane.

2.4 ACCESSORY MATERIALS

A. General: Accessory materials manufactured by the fluid applied water resistive barrier manufacture.

B. Joint and Seam Filler:

1. Basis of Design: PROSOCO R-GUARD Joint & Seam Filler, manufactured by PROSOCO, Inc. or approved equal.
2. Product is a single component, fiber-reinforced STPE gun-grade detailing compound for filling joints and cracks in substrates wherever fluid applied water resistive barriers or liquid flashing is to be applied or as required in the Drawings.

C. Liquid Flashing:

1. Basis of Design: PROSOCO R-GUARD FastFlash, manufactured by PROSOCO, Inc. or approved equal.
2. Product is a single component STPE gun-grade waterproofing, adhesive and detailing compound for use as a liquid flashing membrane.

D. Air Barrier Sealant:

1. Basis of Design: PROSOCO R-GUARD AirDam, manufactured by PROSOCO, Inc. or approved equal.
2. Product is a single component STPE gunnable air barrier sealant.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions.

3.3 JOINT AND SEAM FILLER

A. General: Fill joints, seams and cracks according to manufacturer's written instructions.

B. Filling Joints, Seams and Cracks:

1. Fill or repair cracks larger than 1/2".
2. Apply a thick bead of joint and seam filler to all sheathing joints, seams and cracks.
3. Trowel and spread product 1" beyond seam at each side to 20-30 mil thickness.
4. Allow to skin before installing other waterproofing or water resistive barrier components.

C. Waterproofing Fastener Penetrations:

1. Spot fastener penetrations with joint and seam filler.
2. Allow to skin before installing other waterproofing or water resistive barrier components.

D. Detailing Rough Openings:

1. Fill or repair cracks larger than 1/2 inch.
2. Apply a thick bead of joint and seam filler to all inside corners, cracks, joints and seams within the rough opening.
3. Trowel and spread product 1" beyond seam at each side to 20-30 mil thickness.
4. Allow to skin before installing other waterproofing or water resistive barrier components.

E. Flashing Transitions:

1. Fill or repair cracks larger than 1/2 inch.
2. Fasten the flashing leg to the vertical wall surface using a bead of joint and seam filler.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Fill any voids between the flashing leg and the vertical wall with joint and seam filler.
4. Apply and tool joint and seam filler as needed to direct water from the vertical wall to the face of the flashing.
5. Apply and tool joint and seam filler at inside corners to ensure positive drainage.
6. Allow treated surfaces to skin before installing liquid flashing.
7. Use joint and seam filler to fill any remaining surface imperfections to provide positive drainage and continuous support of fluid-applied flashing membranes, waterproofing or water resistive barrier components.

F. Curing and Drying: allow product to cure and dry as required by manufacturer's written instructions.

3.4 LIQUID FLASHING

A. General: Prepare surfaces and apply liquid flashing according to manufacturer's written instructions and project construction details.

B. Rough Openings:

1. Apply a thick bead of liquid flashing over any visible gaps in the prepared rough opening.
2. Immediately press and spread the wet product into the gaps.
3. Allow treated surfaces to skin.
4. Starting at the top, apply a thick bead of liquid flashing in a zigzag pattern to the structural wall surrounding the rough opening.
5. Spread the wet product to create an opaque, monolithic flashing membrane which surrounds the rough opening and extends 6 inches (152 mm) min. over the face of structural wall. Apply and spread additional product as needed to create an opaque, monolithic flashing membrane free of voids or pin holes.
6. Apply additional product in a zigzag pattern over the structural framing inside the rough opening.
7. Spread the wet liquid flashing to create an opaque, monolithic flashing membrane which covers the inside of the rough opening and mates with the adjacent membrane which surrounds the rough opening. Apply and spread additional product as needed to produce an opaque, monolithic flashing membrane free of voids or pin holes.
8. Allow treated surfaces to skin before installing windows, doors and other wall assembly, waterproofing or water resistive barrier components.

C. Flashing Transitions:

1. Fill any voids between the top of the flashing leg and the vertical wall with joint and seam filler. Tool to direct water from the vertical wall to the flashing.
2. Apply a generous bead of liquid flashing to the top edge of the flashing leg.
3. Spread the wet product to create a monolithic "cap flash" flashing membrane extending 2-inches up the vertical face of the structural wall and 1-inch over the flashing membrane. Apply additional product as needed to achieve a void and pinhole free surface. This "liquid termination bar" helps secure the flashing and ensures positive drainage from the wall surface to the flashing.
4. Allow treated surfaces to skin before installing other wall assembly, waterproofing or water resistive barrier components.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.5 AIR BARRIER SEALANT

A. General: Prepare surfaces and apply air barrier sealant according to manufacturer's written instructions.

B. Application:

1. Install sealant with professional grade caulking gun in continuous beads without gaps or air pockets.
2. Tool sealant immediately to ensure complete wetting of joint bond surface and to produce a smooth, concave joint profile flush with the edges of the adjacent surface. Where horizontal and vertical surfaces meet, tool sealant to create a slight cove so as not to trap moisture or debris.

C. Curing and drying: allow product to cure and dry as required by manufacturer's written instructions.

3.6 FLUID APPLIED WATER RESISTIVE BARRIER

A. General: Apply fluid water resistive barrier material to form a seal with flashing to achieve a continuous water resistive barrier and accessories according to the manufacturer's written instructions. Apply fluid water resistive barrier within manufacturer's recommended application temperature ranges.

B. Application:

1. Ensure all surfaces have been prepared as required by these specifications and the manufacturer's written instruction.
2. Provide continuous structural support of water resistive barrier system at transitions, changes in direction and gaps.
3. Comply with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of sealed.connections between assemblies (water resistive barrier and accessories).
4. Roller apply using vertical strokes with a slight diagonal slant and ensure there are no pinholes, voids or gaps in the membrane.
5. Apply to a minimum thickness of 12 mils.
6. Allow product to cure and dry per manufacturer's written instructions.
7. Site conditions for application temperature and dryness of substrates shall be maintained.
8. Maximum exposure time of materials to UV deterioration has not been exceeded.
9. Inspect Water resistive barrier membrane, materials, and accessories before installing cladding.
10. Laps and transitions applied in shingled fashion in the correct direction or sealant has been applied on exposed edges, with no fishmouths.
11. Termination mastic shall be applied on cut edges.
12. Strips and transition strips shall be firmly adhered to substrate.
13. Use only compatible materials.
14. Seal all penetrations.
15. Verify continuity of water resistive barrier system has been achieved throughout the building envelope with no gaps or holes. Fill deep gouges with joint and seam filler. Repair any punctures.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

16. Where translucent or insufficient thickness, damaged or other areas of deficiencies occur, apply additional water resistive barrier and accessory materials, according to manufacturer's written instructions.
17. If the surface of the primary water resistive barrier or liquid flashing membrane is damaged during construction, remove all loose surface contaminants before selective re-coating with additional water resistive barrier or liquid flashing. Overlap repairs, penetration treatments, transitions, rigid flashing and other water resistive barrier components to ensure positive drainage and continuity of the air and water resistive barrier.

C. Penetrations, joints and seals of the air barrier and paths of air leakage shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location.

D. Do not cover water resistive barrier until it has been reviewed by architect.

E. Correct deficiencies in or remove water resistive barrier that does not comply with requirements; repair substrates and reapply water resistive barrier components.

3.7 FIELD QUALITY CONTROL

A. Blower door test - Provide a 2015 WSEC compliant air barrier test performed by a qualified testing agency

1. Air barrier test report shall be submitted to jurisdiction once test is completed;
2. If test results exceed 0.4 cfm/ft2 at 0.3 in. Wg then visually inspect air barrier and seal noted sources of leakage;
3. Submit a follow-up report to jurisdiction noting corrective measures taken if needed

3.8 CLEANING AND PROTECTION

A. Protect water resistive barriers and accessories from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect water resistive barriers and accessories from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace products that have been exposed beyond the limits allowed by the manufacturer.
2. Protect water resistive barriers and accessories from contact with incompatible materials and sealants not approved by water resistive barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exposed-fastener, lap-seam metal roof panels at metal awnings.
2. Concealed fastener snap seam roof panels at Kitchen/ Dining/ Dayroom roof.
3. Roof Insulation
4. Coverboard
5. Air and Vapor Barrier

B. Related Sections:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.

2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 05 Section "Steel Decking" for steel roof deck supporting metal roof panels.

4. Division 07 Section "Metal Wall Panels".

5. Division 07 Section "Sheet Metal Flashing and Trim" for field-formed fascia, flashings, roof drainage systems, and other sheet metal work not part of metal roof or wall panel assemblies.

6. Division 07 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.4 DEFINITIONS

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weathertight roofing system.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Water Penetration: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:

1. Test-Pressure Difference: **2.86 lbf/sq. ft**.

C. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of roof panel and accessory.

B. Sustainable Design Submittals:

1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):

a. Flashing and trim.

D. Samples for Initial Selection: For each type of metal roof panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Metal Roof Panels: 12 inches (300 mm) long by actual panel width. Include fasteners, clips, closures, and other metal roof panel accessories.
2. Trim and Closures: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
3. Accessories: 12-inch- (300-mm-) long Samples for each type of accessory.

F. Coordination Drawings: Roof plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installers of the items involved:

1. Roof panels and attachments.

2. Roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, and items mounted on roof curbs.

G. Qualification Data: For qualified Installer.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

I. Field quality-control reports.

J. Maintenance Data: For metal roof panels to include in maintenance manuals.

K. Warranties: Samples of special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Preinstallation Conference: Conduct conference at Project site. Coordinate with Metal wall panels.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.

B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

1.10 COORDINATION

A. Coordinate metal roof panels with, flashing, trim, and construction of other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace metal roof panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Structural failures including rupturing, cracking, or puncturing.
    b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.

1. Surface: Smooth, flat finish.
2. Exposed Coil-Coated Finish:

a. 3-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored prime coat finish prepped for field painting per Section 09 9100

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 MISCELLANEOUS MATERIALS

A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal roof panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

1. Provide panel fasteners of appropriate length to penetrate full depth of insulate into structural substrate

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 EXPOSED-FASTENER, LAP-SEAM METAL ROOF PANELS **(MTL-05)**

A. General: Provide factory-formed metal roof panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners overlaps. Include accessories required for weathertight installation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Fluted Rib Profile, Exposed-Fastener Metal Roof Panels: Formed with alternating box-fluted ribs across width of panel.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “HR-36 roof and wall” panels by AEP-Span at locations indicated on Drawings or comparable product by one of the following:

    a. Metal Sales Manufacturing Corporation.
    b. The Breyer Company
    c. Taylor Metal products
    d. Nu-Ray Metals
    e. Or Approved Equal.

2. Panel Coverage: 36-inches.
3. Panel Height: 1.5 inches.

4. Material: Aluminum-zinc alloy-coated steel sheet, 24 ga. 0.028-inch (0.71-mm) nominal thickness.

    a. Exterior Finish: 3-coat fluoropolymer or Metallic 3-coat fluoropolymer.
    b. Color: As selected by Architect from manufacturer's full range of standard, premium and metallic colors options.

2.4 CONCEALED FASTENER ROOF PANELS **(MTL-06, Roof Type R2)**

A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.

B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and **intermediate stiffening ribs symmetrically spaced** between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Design Span HP” panels by AEP-Span at locations indicated on Drawings or comparable product by one of the following:
2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

    a. Nominal Thickness: **0.034 inch (0.86 mm)**
    b. Exterior Finish: **Three-coat fluoropolymer**
    c. Color: **As selected by Architect from manufacturer's full range**

3. Clips: **Two-piece floating** to accommodate thermal movement.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Material: **0.064-inch- (1.63-mm-)** nominal thickness, aluminum-zinc alloy-coated steel sheet.

4. Panel Coverage: **16 inches (406 mm)**
5. Panel Height: **1.75 inches (44 mm)**

2.5 ACCESSORIES

A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, rake and ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at rakes and ridges, fabricated of same metal as metal roof panels.
2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

B. Flashing and Trim: Flashing and Trim (Related to Metal Roofing): Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, fascia, and fillers

1. Formed from same material as roof panels, prepainted with coil coating, minimum 0.028 inch (0.45 mm) thick.
2. Finish flashing and trim with same finish system as adjacent metal roof panels.

2.6 AIR AND VAPOR BARRIER

A. Self Adhered Vapor Barrier: ASTM D-5147 15 mil (0.38mm) with minimum permeance rating of 0.03 perm (1.7ng/(s·m2·Pa)

1. Products: Subject to compliance with requirement, provide the following:

a. Sarnafil: “Sarnavap-5000 E SA FR
b. Approved Equal

2. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.7 ROOF INSULATION

A. Polyisocyanurate Board Insulation:

1. General: Preformed roof insulation boards manufactured or approved by PVC roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Product: Sarnafil Sarnatherm Insulation Cellulosic Felt Facer 20 psi rigid polyisocyanurate insulation board with a glass fiber reinforced cellulosic felt facer.

   a. 2" minimum sheet thickness. Use multiple sheets as required.
   b. Roof insulation thermal resistance:

      1) R-40 min (7 inches) at roof type 2 as indicated in drawings.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (12 mm), adhered with low rise foam adhesive.

   1. Products: Subject to compliance with requirements, provide one of the following:

      a. Georgia-Pacific Corporation; "Dens Deck and "Dens Deck Prime".
      b. Or approved equal.

D. Bonding Ashesive: Sarnafil "Sarnacol 2163"

2.9 FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weathertight and minimize noise from movements within panel assembly.

C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

   2. End Seams for Other Than Aluminum: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA's "Architectural Sheet Metal Manual" or by metal roof panel manufacturer for application, but not less than thickness of metal being secured.

2.10 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.

B. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

C. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

D. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Miscellaneous Framing: Install eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

3.3 METAL ROOF PANEL INSTALLATION, GENERAL

A. Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

B. Thermal Movement. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Predrill panels for fasteners.

1. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

C. Install metal roof panels per manufacturers installation instructions and as follows:

1. Field cutting of metal panels by torch is not permitted.

2. Locate and space fastenings in uniform vertical and horizontal alignment.
3. Provide metal closures at rake edges and peak.

4. Flash and seal metal roof panels at edges.

5. Install metal flashing to allow moisture to run over and off metal roof panels.

D. Fasteners:

1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized steel fasteners for surfaces exposed to the interior.
2. At exposed fasteners, provide neoprene washers or washers recommended by manufacturer and mastic to provide weather proof seal

E. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

F. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

1. Coat back side of roof panels with bituminous coating where roof panels will contact wood, ferrous metal, or cementitious construction.

G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concealed-fastener, lapped-seam, metal wall panels and associated trims and flashing.
2. Exposed-fastener, lap-seam metal wall panels and associated trims and flashings.
3. Cold-formed metal support framing system.

B. Related Requirements:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 07 Section "Metal Roof Panels".
4. Division 07 Section “Weather and Air Barrier”
5. Division 07 Section "Sheet Metal Flashing and Trim" for field-formed coping, fascia, flashings, roof drainage systems, and other sheet metal work not part of metal wall panel assemblies.
6. Division 07 “Rainscreen Attachment”
7. Division 07 Section “Joint Sealants”

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Product Data: Manufacturers Product literature, catalogs, and descriptions of any testing that has been performed on system components to indicate that they will have performance capabilities equal or greater to criteria listed in this specification. Include information and samples of wall panels and fasteners.

B. Sustainable Design Submittals:

1. Product Data: Postconsumer recycled content plus one-half of preconsumer recycled content for Project constitutes a minimum of 10 percent of cost of materials used for Project.

C. Shop Drawings: For exterior wall panel assemblies and accessories. Include plans; elevations; sections and details.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Samples for Initial Selections: Manufacturers color charts showing full range of colors available for units with factory-applied color finishes.

E. Samples for Verification: Provide color samples on actual 12-inch x width of panel substrate of requested colors.

F. Material Safety Data Sheets (MSDS) for system components.

G. Sample Warranty: Submit, for Owners acceptance, manufacturer's warranty documents executed by authorized company official.

1.5 QUALITY ASSURANCE

A. Coordination: Conform to Section 01 31 00 for coordination with work of other Sections.

1. Coordinate construction to ensure that wall panel assemblies fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying work.

B. Single Source Responsibility: Furnish system components by or under direct responsibility of same manufacturer.

C. Manufacturer Qualifications: Minimum of 5 years' experience in manufacturing wall panels similar to those specified. Demonstrate conformance to testing requirements.

D. Installer Qualifications:

1. Approved by manufacturer as a qualified installer for work of this Section.
2. Superintendent or foreman overseeing installation on site during work of this Section.
3. Able to document projects of equivalent scope and quality upon request by Architect.

E. Licensed Professionals: Professional Structural Engineer employed by Contractor for design of anchors, fasteners as required for attachment to substrate, licensed in State of Washington.

F. Mock-Ups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation..

1. Locate complete system at location as directed by Architect.
2. Provide as required to illustrate substrate, framing, insulation, panel, corner return and penetrations, and to allow for approval of exterior finishes and aesthetic appearance.
3. Verify mock-up as conforming to manufacturer's instructions and provisions of Contract Documents.
4. Do not begin work of this Section until after inspection by manufacturer's representative is complete and system is accepted by Architect.
5. Protect and maintain accepted mock-up as standard of quality for work of this Section.
6. If approved by Architect, the accepted mock-ups may be incorporated into work of this Section.

G. Preinstallation Meeting: Contractor to conduct conference at project site

1. Attendance: Meet with Owner, Owner's Building Envelope ConsultantArchitect, metal roof panel Installer, and installers whose work interfaces with or affects metal wall panels.
2. Meeting Time: Minimum 3 weeks prior to prior to beginning work of this Section and work of related Sections affecting work of this Section.
3. Location: Project Site.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.6 DELIVERY, STORAGE, AND HANDLING

A. Conform to provisions of Section 01 60 00 and manufacturer's instructions.

B. Ordering: Conform to manufacturers ordering instructions, and lead-time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturers original, unopened, undamaged containers with identification labels intact.

D. Store, handle, and protect materials to keep clean, dry, and protected from damage from weather and construction activities.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual supporting and adjoining construction before fabrication, and indicate recorded measurements on project record drawings conforming to provisions of Section 01 77 00.

B. Established Dimensions: Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of wall panel assemblies corresponding to established dimensions.

1.8 WARRANTY

A. Conform to Warranty requirements specified by Section 01 78 36.

B. Manufacturer: Standard 20 year materials Warranty covering found to be defective, including cold formed metal framing system and prefinished wall panels.

C. Manufacturer Coating Performance Warranty: 20 year warranty against fading, color change, chalking, peeling, cracking, or delaminating of the coating system.

D. Contractor: 5 year labor and materials, weather-tight and performance, warranty, starting from Substantial Completion, and to cover repair of materials found to be defective due to installation errors.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design: Subject to compliance with requirements provide products manufactured by AEP Span or comparable product by one of the following:

a. The Bryer Company
b. Taylor Metal products
c. Or Approved Equal.

2. Substitution Requests: Conform to requirements of Division 1 – Substitutions will only be considered if the finish is of comparable match to the basis of design as judged solely by the Architect.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.2 PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, **Class AZ50 coating designation, Grade 40** (Class AZM150 coating designation, Grade 275); structural quality.
2. Surface: smooth flat finish.
3. Exposed Coil-Coated Finish:

   a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

   b. Metallic Fluoropolymer: AAMA 621. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of **0.5 mil** (0.013 mm).

2.3 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

B. Boxed Rib Profile, Metal Wall Panels: Formed with alternating 4-inch wide boxed ribs spaced at 6**-inches** o.c. across width of panel.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Perception Series PC50-12” panels by AEP-Span at locations indicated on Drawings. **(MTL-01)**
2. Panel Coverage: 12 inches.
3. Panel Height: **1.25 inches**.
4. Material: Aluminum-zinc alloy-coated steel sheet, 24 ga. **0.028-inch** (0.71-mm) nominal thickness.
   a. Exterior Finish: 3-coat fluoropolymer or Metallic fluoropolymer.
   b. Color: As selected by Architect from manufacturer's full range of standard, premium and metallic colors options. Allow for (2) different colors for bidding purposes
5. **No horizontal seams. Provide full height panels as shown on elevations.**

C. Boxed Rib Profile, Metal Wall Panels: Formed with alternating 2-inch wide boxed ribs spaced at **4-inches** o.c. across width of panel.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Flex Series 1.2FX10-12D” panels by AEP-Span at locations indicated on Drawings. **(MTL-03B)**
2. Panel Coverage: 12 inches.
3. Panel Height: **1.25 inches**.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Material: Aluminum-zinc alloy-coated steel sheet, 24 ga. **0.028-inch** (0.71-mm) nominal thickness.
    a. Exterior Finish: 3-coat fluoropolymer or Metallic fluoropolymer.
    b. Color: As selected by Architect from manufacturer's full range of standard, premium and metallic colors options. Allow for (2) different colors for bidding purposes

5. No horizontal seams. Provide full height panels as shown on elevations.

D. Boxed Rib Profile, Metal Wall Panels: Formed with alternating 2-inch wide boxed ribs spaced at **4-inches** o.c. across width of panel.

1. Basis-of-Design Product: Subject to compliance with requirements, provide "Flex Series 1.2FX20-12D" panels by AEP-Span at locations indicated on Drawings. **(MTL-03B)**
2. Panel Coverage: 12 inches.
3. Panel Height: **1.25 inches**.
4. Material: Aluminum-zinc alloy-coated steel sheet, 24 ga. **0.028-inch** (0.71-mm) nominal thickness.
    a. Exterior Finish: 3-coat fluoropolymer or Metallic fluoropolymer.
    b. Color: As selected by Architect from manufacturer's full range of standard, premium and metallic colors options. Allow for (2) different colors for bidding purposes

E. Perforated Flush Metal Panels: Perforated panels formed with vertical panel edges. Formed with full 12 inch panel with no ribs and 0.127" diameter perforation at 0.326" spacing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide "Prestige Series Full 12"" by AEP-Span at locations indicated on Drawings. **(MTL-04)**
2. Material: Aluminum-zinc alloy-coated steel sheet, 24 ga. **0.028-inch** (0.71-mm) nominal thickness.
    a. Exterior Finish: Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    b. Color: As selected by Architect from manufacturer's full range of standard, premium and metallic colors options. – (Allow for (2) color options for Bidding purposes)

3. No vertical seams. Provide full height panels as shown on elevations.

F. Vertical-Rib, Snap-Joint, Standing-Seam Metal Wall Panels: Formed with vertical ribs at panel edges and **intermediate stiffening ribs symmetrically spaced** between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.

1. Basis-of-Design Product: Subject to compliance with requirements, provide "Design Span HP" by AEP-Span at locations indicated on Drawings **(MTL-02)**
2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
    a. Nominal Thickness: **0.034 inch (0.86 mm)**

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Exterior Finish: **Three-coat fluoropolymer**
c. Color: **As selected by Architect from manufacturer's full range**

3. Clips: **Two-piece floating** to accommodate thermal movement.

   a. Material: **0.064-inch- (1.63-mm-)** nominal thickness, aluminum-zinc alloy-coated steel sheet.

4. Panel Coverage: **16 inches (305 mm)**
5. Panel Height: **1.75 inches (44 mm)**

6. No horizontal seams. Provide full height panels as shown on elevations.

2.4 COLD FORMED METAL FRAMING COMPONENTS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, **G90** (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, **Class AZ50** (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections subject to compliance with details as required for support and alignment of metal panel system.

1. Provide with weep drains for moisture mitigation and air flow.

2.5 FABRICATION

A. Tolerances:

1. Panel Bow: Maximum 0.5 percent of panel dimension in width and length.
2. Panel Dimension: Allow for field adjustments, as instructed by manufacturer, where final dimensions cannot be established by field measurement before completion of panel manufacturing.
3. Panel Lines, Breaks, and Angles: Sharp and true, surfaces free from warp and buckle.
4. Panel Surfaces: Free of scratches and marks caused during fabrication.

B. Vapor Management: Fabricate panels as a ventilating rainscreen cavity. Provide perforated metal closures and components as required to insure proper ventilation of the system.

2.6 ACCESSORIES

A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch-** (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Clip: Panel clip with pre-drilled holes attachment holes at one end and panel hook at other end, sized to fit panels.

1. Product: AEP Span; Flex Series **Stand Off** Clip or approved equal.
2. Material: 18 gauge (.0438 Min.), 40ksi yield min., G90 galvanized, material in conformance with ASTM A-653 Class G90.
3. Panel clips to be of proper design to resist uplift forces and reduce permanent deflection of panel assembly under design loads. Panel system manufacturer to provide proof that this has been addressed through use of clip strengthening ribs, short clip reach, or similar.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch** (13 mm) wide and **1/8 inch** (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

F. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify conditions ready to receive work of this Section before beginning.

B. Panel Substructure: Verify level and plumb, free of defects detrimental to work and erected in conformance to established building tolerances.

C. Water Resistive Barrier (WRB): Installed in conformance to W.R.B. manufacturer's instructions. Verify discontinuities in W.R.B. properly flashed and sealed.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.3 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels horizontally over vertically aligned metal furring channels unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Commence metal wall panel installation and install minimum of **300 sq. ft. (27.8 sq. m.)** in presence of factory-authorized representative.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. Flash and seal metal wall panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather barrier and flashings that will be concealed by metal wall panels are installed.
4. Install screw fasteners in predrilled holes.
5. Locate and space fastenings in uniform vertical and horizontal alignment.
6. Install flashing and trim as metal wall panel work proceeds.
7. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
8. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete and elsewhere as indicated or, if not indicated, as necessary for waterproofing.
9. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
10. Provide weathertight escutcheons for pipe and conduit penetrating exterior walls.

B. Fasteners:

1. Steel Wall Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized steel fasteners for surfaces exposed to the interior.
2. At exposed fasteners, provide neoprene washers or washers recommended by manufacturer and mastic to provide weather proof seal.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal wall panel manufacturer.

D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.

1. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

E. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

F. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
3. At panel splices, nest panels with minimum **6-inch** (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 feet** (3 m) with no joints allowed within **24 inches** (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than **1 inch** (25 mm) deep, filled with mastic sealant (concealed within joints).
3. Copings: Coordinate installation of roofing, water resistant weather barrier and flashing installation.
4. Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic, or other permanent separation as recommended by manufacturer.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.

B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid Phenolic High-Pressure Laminate (HPL) Exterior Wall Panels.

2. Accessories.

B. Related Sections:

1. Division 01 Section “Submittal Procedures” for submittal requirements.
2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
4. Section 05 40 00 ”Cold-Formed Metal Framing” for furring, framing, grounds, nailers, and blocking.
5. Section 06 1600 "Sheathing".
6. Section 07 2700 "Weather & Air Barrier".
7. Section 07 6200 “Sheet Metal Flashing & Trim”.
8. Section 07 6500 “Flexible Flashing”.
9. Section 07 9200 “Joint Sealants”.
10. Section 09 9100 “Painting”.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:

1. Product Data: For paints and coatings, indicating VOC content.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.

C. Provide manufacturer's "Best Practices" installation information.

D. Samples for Initial Selection: For siding including related accessories.

E. Samples for Verification: For each type, color, texture, and pattern required.

1. 12-inch long-by-12-inch-wide Sample of siding showing edge finish.

2. 12-inch- (300-mm-) long-by-actual-width Samples of trim and accessories.

F. Shop Drawings: Submit plan, section, elevation and perspective drawings necessary to describe and convey the layout, profiles and product components, including edge conditions, panel joints, fixture location, anchorage, accessories, finish colors, patterns and textures.

G. Qualification Data: For qualified siding installation contractor trained and approved by the manufacturer's representative.

H. Product Certificates: For each type of siding, from manufacturer.

I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

J. Research/Evaluation Reports: For each type of siding required, from the ICC.

K. Warranty: Sample of special warranty.

L. Maintenance Data: For each type of siding and soffit and related accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed siding installations similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Siding and Accessories: Obtain each texture, pattern and type of siding and related accessories from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical wall area as shown on Drawings.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Build mockups for **siding** including accessories.

    a. Size: **48 inches (1200 mm) long by 60 inches (1800 mm) high**.
    b. Include outside corner on one end of mockup **and inside corner on other end, window and door openings and material transitions**.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Pre-installation Conference: Conduct conference at Project site to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in an enclosed area protected from direct sunlight, moisture and heat. Maintain a consistent temperature and humidity.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Stack panels using protective dividers to avoid damage to decorative surface.

D. For horizontal storage, store sheets on pallets of equal or greater size as the sheets with a protective layer between the pallet and sheet and on top of the uppermost sheet.

E. Do not store sheets, or fabricated panels vertically.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation only if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions and if substrate is completely dry.

1.8 COORDINATION

A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.9 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Solid Phenolic Exterior Panels:

1. Special Project Warranty: Submit an express limited and transferable written warranty, executed by siding manufacturer, agreeing to repair or replace siding that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, cracking, deforming, rotting, delamination or otherwise deteriorating beyond normal weathering. Below is an example only.

2. Warranty Period: At project closeout, provide Manufacturer's limited ten (10) year warranty covering defects in materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Basis of Design: Fiberesin Industries, Inc. N48W37031 E. Wisconsin Avenue, Oconomowoc, WI Toll Free: (262) 567- 4427

2.2 SOLID PHENOLIC EXTERIOR PANELS (HPL-01 and HPL-02)

A. Products: Solid panel manufactured using a combination of high pressure and temperature to create a flat panel created from thermosetting resins, homogenously reinforced with wood-based fibers and an integrated decorative surface or printed décor.

1. Basis of design product: Stonewood

a. Style: Select
b. Color: Two as selected by Architect from manufacturer's full range

1) TBD (HPL-01)
2) TBD (HPL-02)
3) Single Sided black reverse at building.

c. Finish: Factory #60 Matt
d. Panel Size: 48 inches x 96 inches
e. Thickness: 3/8 inch
f. Panel Core: Phenolic resin treated layer, black and natural brown kraft paper
g. Decorative Layer: Melamine resin, proprietary pigmented and treated
h. Weather and UV Resistant Layer: 2-mil, proprietary layer combining pigment protection, Ultraviolet light and weather resistant layer
i. ASTM E84 Flame and Smoke Development**: Class B** Type V construction

2. Physical Properties

a. Flexural Strength, ASTM D-790pon

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1) MD 16,000 psi
2) CD 12,000 psi

b. Flexural Modulus, ASTM D-790

1) MD 1.5 x 10^6 psi
2) CD 1.1 x 10^6psi

c. Tensile Modulus, ASTM D638

1) MD 15,000 psi
2) CD 10,000 psi

d. Fastening Strength, ASTM D-1761: **1,260 pound-force**
e. Extended surface Burn, ASTM E-2768

1) Max Flame Front =10 ft

2.3 FABRICATION

A. Fabrication Tolerances: Manufacturer to provide shop fabrication and pre-finishing for a warranted finish.

1. NEMA Testing Results

a. Dimensional Change, 3.11 test

1) Length (Machine Direction): 0.25 percent
2) Width (Cross Direction): 0.50 percent

b. Weight Per Unit Area: 2.68 lbs./sf (13.12kg/m2)

1) Density: 86 pounds per cubic foot

2.4 ACCESSORIES

A. Fasteners: Manufacturer approved austenitic stainless steel fastener with bi-metal welded carbon steel point.

1. Concealed fasteners

B. Attachment System: Manufacturer approved sub-frame system to support a cladding weight of up to 8 pounds per square foot, fabricated of 0.09-inches 6063 T5 extruded aluminum or 16-gauge G90 Galvanized steel.

1. Stonewood CF Concealed Fastener Mounting System

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine materials, installation instructions, and review manufacturers instructions on site.

B. Verify panel style, color, and fasteners are approved by Architect.

C. Verify substrates and adjacent surfaces are level and plumb for installation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Do not begin work until construction has progressed to allow installation of materials.
2. Verify manufacturers fastener spacing requirements.

D. Proceed with work when construction has progressed to allow a warranted installation.

1. Installation deems acceptance of work for a warranted installation.

3.2 INSTALLATION

A. Install in accordance with manufacturers written instructions and Shop Drawings, maintaining required 1-inch ventilation spacing requirement.

B. Fasten panels to an approved attachment system structurally supported by aluminum, galvanized steel or wood stud supported wall.

C. Install panel square, edges clean and true to size.

1. Cut panels to fit at perimeter and around penetrations with minimum 3/8-inch gap.
2. Re-chamfer field cut edges.

D. Do not install damaged, irregular and defective panels.

3.3 FIELD QUALITY CONTROL

A. Inspect panel ventilation at top and bottom of wall, and manufacturers fixed and floating holes instructions have been followed.

B. Verify installation, fasteners and connections with adjacent materials, and transitions have been completed in accordance with shop drawings.

3.4 ADJUSTING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

3.5 PROTECTION

A. Protect surface, corners and components from damage prior to Owner occupancy using temporary protection.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Provide a thermally broken, rainscreen attachment system for attachment of exterior cladding installed over exterior rigid insulation.

B. Related Sections:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Refer to Division 05 Section “Steel Stud Framing”.
4. Refer to Division 06 Section “Sheathing”.
5. Refer to Division 07 Section “Air Barrier”
6. Refer to Division 07 Section “Formed Metal Wall Panels”
7. Refer to Division 07 Section “Thermal Insulation” for exterior mineral wool board insulation

1.3 SYSTEM DESCRIPTION

A. System assembly shall include the following components (see relevant sections) from the substrate out:

1. Substrate: Wall sheathing.
2. Weather Resistant/Air Barrier over substrate.
3. Rigid insulation.
4. Thermally broken rainscreen attachment system.
5. Exterior cladding.

B. Design Requirements:

1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
2. Employ registered professional engineer, licensed to practice engineering in jurisdiction where Project is located, to engineer each component of rainscreen attachment system.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Structural Design: Exterior-insulated rainscreen wall assembly capable of withstanding effects of load and stresses from dead loads, wind loads, ice loads (if applicable) as indicated on Structural General Notes on Structural Drawings, and normal thermal movement without evidence of permanent defects of assemblies or components.

   a. Thermal Movements: Provide assemblies that allow for thermal movements resulting from the following maximum ambient temperatures by preventing overstressing of components and other detrimental effects:

      1) Temperature Change (range): 120 degrees Fahrenheit (67 degrees C), ambient:

4. Support Framing/Attachment System:

   a. Frequency and spacing of brackets as indicated by manufacture in project specific engineering package.

C. Performance Requirements:

1. Rainscreen Attachment System Performance: Comply with ANSI/ASHRAE 90.1-2010 maximum U-Value for walls.
2. Thermal Performance:

   a. Wall Assembly effective R-Value as indicated in drawings
   b. Full constructed exterior assembly must have a minimum 90% EFFECTIVE R-value when compared to the exterior insulation's rated R-Value.
   c. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation not allowed.
   d. Perform effective R-Value calculation or modeling in accordance with ASHRAE guidelines.

3. Structural Performance:

   a. Framing Members:

      1) Test framing components to AAMA TIR- A8-[04] – Section 7.2 to determine structural performance and effective moment of inertia for each perforated component. Minimum Effective Moment of Inertia for Primary Rail: 0.0134 in.
      2) Localized bending stress for eccentrically loaded framing members must be evaluated with the maximum effective length of resisting element not more than 12 inches.

   b. Fasteners:

      1) Tension shall be taken as sum of direct tension plus tension due to prying for eccentrically loaded connections. Prying may be reduced or eliminated if proven via engineering analysis or testing.
      2) Minimum Safety Factor of 3 for both tension and shear values.
      3) Combined tension and shear shall be evaluated according to an interaction formula. Sum of terms shall not exceed 1.0.

1.4 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and descriptions of testing performed on system components to indicate meeting or exceeding specified performance.

B. Sustainable Design Submittals:

1. Comply with requirements of Section 01 81 13
2. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content data.

   a. Include statement indicating costs for each product having recycled content.

C. Shop Drawings:

1. Submit connection details to the cladding manufacturer, showing interface of rainscreen attachment system to substrate and panels with adjacent construction, signed and sealed by Professional Engineer.
2. Show system installation and attachment, including fastener size and spacing.

D. Structural Calculations:

1. Submit rainscreen attachment manufacturer's comprehensive Structural Design analysis signed and sealed by a Professional Engineer.

E. Samples: Submit following material samples for verification:

1. Wall Brackets: Two (2) samples.
2. Horizontal Rails: Two (2) 12-inch long samples.

F. Test Reports:

1. Test to the following standards and provide written test reports by a third party:

   a. AAMA TIR-A8-[04]: Structural Performance of Composite Thermal Barrier Framing Systems – Section 7.2.

2. Comprehensive three-dimensional thermal modeling report indicating framing systems impact on exterior insulation rated R-value.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Minimum 5 years' experience specializing in the manufacturing of façade attachment/support framing similar to those specified.
2. Ability to demonstrate conformance to testing requirements.

B. Installer Qualifications:

1. Minimum of 3 years' documented experience or minimum of 5 completed projects of equivalent scope and quality and recommended by manufacturer to perform work of this Section.
2. Onsite superintendent or foreman overseeing installation on site during entire work of this Section with experience equivalent to installer and in good standing with the manufacturer.

C. Engineer Qualifications: Registered professional engineer experienced in the design of curtain wall systems, anchors, fasteners and licensed to practice engineering in the jurisdiction where Project is located.

D. Pre-Installation Meeting:

1. Discuss sequence and scheduling of work and interface with other trades.
2. Review metal wall framing assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
3. Review and document methods, procedures and manufacturer's installation guidelines and safety procedures for exterior wall assembly.

E. Mock-Ups: Coordinate mock-up materials and requirements with mock-up specified in Division 01.

1.7 QUALITY CONTROL

A. Single source responsibility:

1. Furnish engineered rainscreen attachment system components under direct responsibility of single manufacturer.

B. Field Measurements: Verify actual supporting and adjoining construction before fabrication.

C. Record field measurements on project record shop drawings.

D. Established Dimensions: Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of rainscreen attachment system corresponding to established dimensions.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials and components in manufacturers' original, unopened and undamaged containers or bundles, fully identified. Exercise care to avoid damage during unloading, storing and installation.

B. Store, protect and handle materials and components in accordance with manufacturer recommendations to prevent damage, contamination and deterioration. Keep materials clean, dry, and free of dirt and other foreign matter, and protect from damage due to weather or construction activities.

1.9 SEQUENCING

A. Ordering: Comply with manufacturers' ordering instructions and lead time requirements to avoid construction delays.

B. Coordinate construction to ensure that assemblies fit properly to supporting and adjoining construction; coordinate schedule with construction in progress to avoid delaying work.

1.10 WARRANTY

A. Manufacturer Warranties:

1. Attachment System: Ten (10) year Limited Warranty.

a. Covers components of the attachment system, including structural failure of components when all the materials and components are supplied and installed per manufacturer's requirements.
b. Includes labor and material for removal and replacement of defective material.
c. Includes labor to remove and reinstall façade finish panels, finish closures and façade finish accessories necessary to access defective material.

B. Contractor's Warranties: 1-year labor warranty, starting from Substantial Completion, to cover repair of materials found to be defective as a result of installation errors.

C. Limitation of Warranties: Exclude repairs, replacement, and corrective work to the substrate, primary structure, finish panels, and/or property – unless otherwise noted above. Warranties exclude mechanical damage due to abuse, neglect, primary structure failure, or forces of nature greater than normal weather conditions.

1.11 MAINTENANCE

A. Extra Materials: For use by Owner in building maintenance and repair, provide 3 percent additional rainscreen attachment components in new, unopened cartons, packaged with protective covering for storage and identified with appropriate labels.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 RAINSCREEN ATTACHMENT/SUPPORT FRAMING SYSTEM

A. Comply with ANSI/ASHRAE 90.1-2010.

B. Coating Material: ASTM A1046, Zinc-Aluminum-Magnesium, minimum thickness ZM40.

1. ASTM A653 Galvanized steel is not acceptable.

C. Steel Classification: Structural Steel (SS), Grade 50, 50 ksi Yield.

D. Spacing: Comply with manufacturer's Professional Engineer's project specific calculations.

E. Wall Brackets:

1. Minimum 0.074 inch thick (14 gauge) sheet steel.
2. Dimensions:
    a. Bracket Base: Minimum 3.125 inch high by 2.125 inch wide.
    b. Offset Brackets: 2 inch depth and 4 inch depth
        1) Align offsets to differing wall planes as shown on Drawings.
3. Pre-Punched Holes: Two wall anchors per bracket.
4. Basis of Design Product: ThermaBracket-S by Knight Wall Systems or approved equal.

F. Primary Horizontal Rail, Static S-Series.

1. Minimum 0.046-inch thick (18 gauge) cold-formed steel.
2. Profile: C channel, two flanges of equal length and one web.
3. Nominal Dimensions: Minimum 1.0 inch flange for attaching to wall bracket and 1.625 inch at web.
4. Pre-Punched Attachment Holes: 1.0 inch on center along length of track and oversized allowing for thermal contraction and expansion of rail without placing stress on brackets.
5. Basis of Design Product: S-Rail by Knight Wall Systems or approved equivalent.

G. Secondary Vertical Rail: Nominal 0.046 inch thick (18 gauge) cold-formed steel.

1. Profile: Hat channel with stiffening lips.
2. Profile Depth: 0.75 inches.
3. Girt Fastening Face: Manufacturer's recommendation as Engineered.
4. Weep Drains: 0.75 inches diameter at 4 inches on center along flanges to allow for free air flow laterally.
5. Attachment Holes: Locate at 2 inch on center along back to facilitate number 14 self-drilling self-tapping screw attachment to primary rail.
    a. Oversize holes to allow for thermal contraction and expansion of rail.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

6. Basis of Design: PanelRail™ by Knight Wall Systems or approved equal.

H. Reveal Rail: Nominal 0.046 inch thick (18 gauge) cold-formed steel.

1. Profile: Square hat channel with stiffening lips.
2. Depth: 0.75 inches.
3. Dimensions: 2.0 inches at web, 1.625 inches at each flange with 0.25 stiffening lips.
4. Basis of Design: RevealRailTM by Knight Wall Systems or approved equivalent.

I. Thermal Isolation:

1. Material: Injection molded Polyoxymethylene copolymer (POM), non-fiber reinforced.
2. Tensile Yield Strength: 9.57 ksi per ISO 527.
3. Melting Temperature: 329 degrees Fahrenheit per ISO 3146.
4. Components:
    a. Wall Anchor Isolation Washer: minimum 0.125 inch thick.
    b. Support Wall Substrate Isolation: Minimum 0.375-inch thick at each wall bracket.
    c. Rail to Bracket Isolation: Minimum 0.125 inch thick at each connection.
    d. Bracket Shim: Match support wall substrate isolator profile; available in 0.125-inch thickness and does not decrease thermal or structural performance of system.
5. Basis of Design: ThermaStop™ Isolators by Knight Wall Systems or approved equal.

J. Fasteners:

1. Sufficient length to provide solid attachment to structure as required by manufacturer.
2. Thermally isolated.
3. Framed substrate with sheathing: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
    a. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
    b. Minimum ultimate pull-out capacity from 18 gauge steel: 450 pounds.
4. For primary to secondary rail connection: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
    a. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
    b. Minimum ultimate pull-out capacity from 18 gauge steel: 450 pounds.

K. Accessories:

1. Bracing, Furring, Bridging, Plates, Gussets, and Clips: Formed sheet steel, thickness as necessary to meet structural requirements for special conditions encountered.
2. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with manufacturer requirements for installation conditions affecting performance of the work.

1. Do not proceed with installation until unsatisfactory conditions have been corrected.
2. Ensure weather-resistant barrier (WRB) is installed prior to installing rainscreen attachment system.
3. Ensure fenestration, transitions, discontinuities, sills, and ledgers are flashed and sealed to move moisture to the exterior of the building.

B. Field verify architectural details and mechanical and electrical requirements prior to commencing installation.

C. Commencement of installation constitutes acceptance of existing conditions and acceptance of responsibility for satisfactory performance.

3.2 RAINSCREEN ATTACHMENT SYSTEM INSTALLATION

A. Preparation: Review areas of potential interference and conflicts and coordinate layout and support provisions for interfacing work.

B. Installation: Install in strict accordance with manufacturer's installation instructions.

C. Wall Brackets and Primary Rail:

1. Mount wall brackets at 16 inch on center horizontally [vertically] on support wall (at each stud location).
    a. Brackets must be laid out at 0.5 inch increments vertically or horizontally.
    b. Tighten screws to substructure to a snug tight condition and not stripped. Do not over-torque beyond manufacturer's recommendation. If installed using hand tools, verify for each installer at beginning of project using snug-tight criteria. Do not use stripped holes.
2. Thermally isolate wall bracket attachments by sandwiching thermal break material between metal bracket and support wall substrate.
3. Thermally isolate screw fastener washers using material to thermally isolate fastener heads from metal bracket.
4. Mineral Fiber Insulation: Install to expand into and friction fit between wall brackets as specified by Section 072100 prior to installing horizontal rails.
5. Attach horizontal rail to wall bracket stem by use of a self-tapping screw fastener through the pre-punched holes in the rail and into the pre-punched pilot holes on the bracket.
6. Isolate horizontal rail from bracket by sandwiching a thermal break material between rail and bracket stem.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

7. Attach horizontal rail at proper pre-punched pilot holes on bracket stem to align plumb and true. Account for irregularities in support wall.
8. Establish and re-establish and restart vertical bracket locations using laser or chalk-line at fenestrations and other obstructions to establish horizontal alignments.

D. Secondary Rail:

1. Space to make suitable bearing surfaces for each cladding system as instructed by manufacturer and as shown on Architect accepted shop drawings.
2. Begin at bottom and mount to horizontal rails using No. 14 self-drilling self-tapping stainless steel screws.
3. Tighten screws to snug tight. Verify equivalent snug tight condition for installers using hand tools.
4. Install successive vertical rails as required for panel type and engineering.
5. When encountering fenestrations and other openings, mount vertical rails so that fastening points are as close to the lower and upper edges as possible.

E. Touch-up shop-applied protective coatings damaged during handling and installation.

F. Use shearing instruments (i.e. snips, nibbler, etc.) for cutting metal framing components. Saws are not recommended, as the sparks produced during cutting will damage the anti-corrosion coating. If sparks are generated during cutting, be sure the portion of the component to be installed on the building is protected from sparks and that any stockpile near the cutting station is also protected.

G. The systems components should not be cut while installed on the building, unless using a shearing instrument.

H. Replace thermal isolator pieces that break during installation.

I. Provide a 3/8" – 1/2" gap between girts for expansion when multiple lengths of rail are installed.

J. Minimum length of installed cut primary rail is 12" and must be attached to at least two separate wall brackets to prevent rotation of rail. Unsupported cantilever must not exceed 6" unless specified differently by manufacturer's engineer.

K. Minimum length of installed cut secondary rail is 12" and must be mechanically attached to at least two separate primary rails.

3.3 ERECTION TOLERANCES

A. Maximum Framing Member Variation from True Position: 1/4 inch.

B. Maximum Framing Member Variation from Plane:

1. Individual Framing Members: Do not exceed 1/4 inch in 10 foot.
2. Accumulative Over-all Variation for Wall and Floor System: Do not exceed 1/4 inch.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Technical Service: Make intermittent and final inspection to verify installation in conformance to manufacturer instructions and suitable as framing assembly for subsequent metal panels, acrylic plastering, and other cladding installations.

1. Confirm snug tight and fastener sizing.
2. Confirm framing members installed in correct orientation.

3.5 ADJUSTING

A. Inspect and adjust after installation. Replace or repair defective work.

B. Adjust, and reconfigure as necessary to accommodate cladding systems for installations over work of this Section. Do not reuse pre-drilled holes unless fastener size is increased.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Adhered polyvinyl-chloride (PVC) roofing system.
2. Cover and Substrate boards.
3. Vapor Barrier.
4. Roof Insulation.
5. Protection Layer
6. Insulation Crickets.
7. Base Flashing.
8. Miscellaneous Flashings (including PMMA)
9. Roof walkway pads.

B. Related Requirements:

1. Section 01 40 00 “Quality Requirements” for Building Envelope Consultant.
2. Section 01 81 13 “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Section 05 31 00 "Steel Decking" for insulation at acoustic decking
4. Section 05 0400 “Cold Formed Framing”
5. Section 06 10 00 "Rough Carpentry"
6. Section 06 16 00 "Sheathing"
7. Section 07 62 00 "Sheet Metal Flashing and Trim"
8. Section 07 92 00 "Joint Sealants"
9. Division 22 – Plumbing for roof drains.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

1. Meet with Owner, Owner's Envelope Consultant, Architect, Owner's insurer if applicable, roofing Installer, roofing system manufacturer's representative, deck Installer, and
2. Installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
4. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

B. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Owner's Envelope Consultant, Architect, Owner's insurer if applicable, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.6 SUBMITTALS

A. Product Data: For each type of product.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Sustainable Design Submittals:

1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

D. Samples for Verification: For the following products:

1. Sheet roofing, provide manufacturer's full range of color samples
2. Roof insulation.
3. Walkway pads or rolls, of color required.
4. Prefinished sheet metal.
5. Six insulation fasteners of each type, length and finish.
6. Six roof cover fasteners of each type, length and finish.

E. Qualification Data: For Installer and manufacturer.

F. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

G. Product Test Reports: For components of roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

H. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

I. Field quality-control reports.

J. Sample Warranties: For manufacturer's special warranties.

K. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories and other components of roofing system.

2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain components including roof insulation, fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PVC ROOFING

A. PVC Sheet: ASTM D 4434/D 4434M, Type II, Grade I, glass-fiber reinforced, felt backed.

1. Products: Subject to compliance with requirement, provide the following:
   a. Sika Sarnafil Inc.; “Sarnafil G410 membrane”
   b. Carlisle Syntec ; “Carlisle Sure-Flex FRS PVC Membrane”
   c. Versico; “VersiFlex FRS PVC Membrane”
   d. Duro-Last;”Duro-Fleece 60-MIL Membrane”
   e. Or approved equal.

2. Thickness: 60 mils (1.5 mm), nominal.

3. Exposed Face Color: Color as selected by architect from manufacturer’s full range.

2.3 PROTECTION LAYER

A. PVC Sheet: ASTM D 4434/D 4434M, Type II, Grade I, glass-fiber reinforced.

1. Products: Subject to compliance with requirement, provide the following:
   a. Sika Sarnafil Inc.; “Sarnafil G410 membrane”
   b. Carlisle Syntec ; “Carlisle Sure-Flex FRS PVC Membrane”
   c. Versico; “VersiFlex FRS PVC Membrane”
   d. Duro-Last;”Duro-Fleece 80-MIL Membrane”
   e. Or approved equal.

2. Thickness: 72 mils (1.8 mm), nominal.

3. Exposed Face Color: Color as selected by architect from manufacturer’s full range.

2.4 FLASHING MATERIALS

A. Wall/Curb Flashing

1. Sarnafil G410 Membrane: Fiberglass reinforced membrane adhered to approved substrate using “Sarnacol” adhesive.
2. Metal Flashing: Sarnafil “Sarnaclad” PVC-coated, heat-weldable sheet metal formed into shapes and profiles as indicated and/or required; 25 gauge, G90 galvanized metal sheet with a 20 mil unsupported Sarnafil membrane laminated on one side.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Same color as roofing.

B. Perimeter Edge Flashing

1. Sarnafil “Sarnaclad” PVC-coated, heat-weldable sheet metal formed into shapes and profiles as indicated and/or required; 25 gauge, G90 galvanized metal sheet with a 20 mil unsupported Sarnafil membrane laminated on one side

C. Miscellaneous Flashing

1. Pipe Vent Flashing: Prefabricated vent pipe flashing made from 0.048 inch thick Sarnafil G410 membrane.
2. Corner Flashing: Prefabricated outside and inside flashing corners made of 0.060 inch thick membrane that are heat-welded to membrane or Sarnafil “Sarnaclad” base flashings.
3. Multi-Purpose Sealant: Sealant used at flashing terminations.
4. Adhesive: Sarnafil “Sarnacol 2170” solvent-based reactivating-type adhesive used to attach membrane to flashing substrate.
5. Liquid Flashing: two-part component polymethyl methcrylate-based (PMMA) liquid flashing material. 115 mil (2.9mm) thick, fleece reinforced flashing system compatible with roofing membrane.

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Liquid Flashing: at all roof penetrations including where mechanical screen penetrates roof.

C. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.

D. Bonding Adhesive: Sarnafil “Sarnacol 2170”

E. Slip Sheet: Manufacturer's standard, of thickness required for application.

F. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

G. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch (25 mm wide by 1.3 mm) thick, prepunched.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. The PVC roofing membrane system manufacturer shall be responsible for the selection of all fasteners used to install the roofing system components, so that the installed roofing system is capable of resisting, without failure, the design wind load indicated in the structural notes on the structural drawings.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.6 AIR AND VAPOR BARRIER

A. Self Adhered Vapor Barrier: ASTM D-5147 15 mil (0.38mm) with minimum permeance rating of 0.03 perm (1.7ng/(s·m2·Pa)

1. Products: Subject to compliance with requirement, provide the following:

a. Sarnafil: “Sarnavap-5000 E SA FR
b. Approved Equal

2. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.7 ROOF INSULATION

A. Polyisocyanurate Board Insulation:

1. General: Preformed roof insulation boards manufactured or approved by PVC roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
2. Product: Sarnafil Sarnatherm Insulation Cellulosic Felt Facer 20 psi rigid polyisocyanurate insulation board with a glass fiber reinforced cellulosic felt facer.

a. 2” minimum sheet thickness. Use multiple sheets as required.
b. Roof insulation thermal resistance:

1) R-40 min (7 inches) at roof types 1-3 as indicated in drawings.
2) R-30 min (5 ¼”) at roof type 4 as indicated in drawings.

B. Stone Wool Fiber Insulation Board (at Roof Type R4):

1. General: Rigid, monolithic, dual-density mineral wool insulation board intended for use with mechanically fastened, ballasted or adhered roofing membranes to ASTM C726, complete with high density top layer and white coated glass fibre mat facer.
2. Product: ROCKWOOL, TOPROCK® DD MULTIFIX.

a. Size: 48 x 48 inches.
b. Thickness: [2] inches.
c. Facer: White mineral coated glass fiber mat.

1) Fabric Weight: 8.5 ounces/square yard.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. General: Preformed roof insulation boards manufactured or approved by PVC roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

D. Polyisocyanurate Board Insulation: Sarnafil Sarnatherm Insulation Cellulosic Felt Facer 20 psi rigid polyisocyanurate insulation board with a glass fiber reinforced cellulosic felt facer.

1. 2” minimum sheet thickness. Use multiple sheets as required.
2. Roof insulation thermal resistance:
    a. R-40 min (7 inches) at roof types 1-3 as indicated in drawings.
    b. R-30 min (5 ¼”) at roof type R4 as indicated in drawings.

E. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.

F. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Cover & Substrate Boards: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (12 mm), adhered over insulation with low rise foam adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:
    a. Georgia-Pacific Corporation; “Dens Deck and “Dens Deck Prime”.
    b. Or approved equal.

D. Bonding Ashesive: Sarnafil “Sarnacol 2163”

2.9 WALKWAYS

A. Flexible Walkways: Loose laid, one piece welded, flexible DINP plasticized Polyvinyl Chloride (PVC), nonporous, heavy-duty, slip resisting, open grid “duckboard” design with cross directional top ribs walkway pads or rolls, approximately 1/2 inch thick and acceptable to roofing system manufacturer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 VAPOR-RETARDER INSTALLATION

A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively. Continuously seal side and end laps with tape.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.5 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 5.25 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

G. Mechanically Fastened and Adhered Insulation: Install each layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.

2. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ADHERED ROOFING INSTALLATION

A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Install sheet according to ASTM D 5036 and PVC roofing membrane manufacturer's written instructions.

B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing. Execution for Sarnacol 2170 / 2170 VC Adhesive:

1. Over the properly installed and prepared substrate surface, adhesive shall be applied using solvent-resistant 3/4 inch (19 mm) nap paint rollers. The adhesive shall be applied to the substrate at a rate according to Sika Corporation requirements. No adhesive is applied to the back of the Sarnafil G410 feltback membrane. The adhesive shall be applied in smooth, even coats with no gaps, globs, puddles or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be coated with adhesive. The first layer of adhesive shall be allowed to dry completely prior to installing a second layer of adhesive and the membrane.
2. The Sarnafil G410 feltback roof membrane is unrolled immediately into a second layer of wet adhesive. Adjacent to that first installed roll of membrane, another second layer of wet adhesive is applied and the second roll of membrane is immediately unrolled into it, overlapping the first roll by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, the bonded sheet shall be pressed firmly in place with a minimum 100 lb (45 kg) steel, membrane roller, by rolling in two directions.
3. Do not allow the second application of adhesive to dry at all.
4. Weld Sarnafil G410 coverstrips at all Sarnafil G410 feltback seams that do not have a factory selvage edge.
5. The Applicator shall count the amount of pails of adhesive used per area per day to verify conformance to the specified adhesive rate.
6. Do not install when air temperature is within 5° of dew point. Solvent evaporation time increases significantly when temperatures drop.
7. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.

F. Apply roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.7 HOT-AIR WELDING OF SEAM OVERLAPS

A. General:

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches wide when automatic machine-welding and 4 inches wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by approved by Sika Corporation. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Sika corporation Technical Service Representative prior to welding.
3. All membrane to be welded shall be clean and dry.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 METAL FLASHINGS

A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:

1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) – latest issue.
3. Roofing manufacturer’s written recommendations.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Metal Base Flashing/Edge Metal: Sarnafil “Sarnaclad” metal flashings shall be formed and installed per approved shop drawings, and architectural drawings:

1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch.
2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.

C. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.

D. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction

E. Metal joints shall be watertight.

F. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch.

G. Counter flashings shall overlap base flashings at least 4 inches.

H. Hook strips shall extend past wood nailers over wall surfaces by 1-1/2 inch minimum and shall be securely sealed from air entry.

3.10 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

B. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.12 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner>.
2. Address: <Insert address>.
3. Building Name/Type: <Insert information>.
4. Address: <Insert address>.
5. Area of Work: <Insert information>.
6. Acceptance Date: _____.
7. Warranty Period: <Insert time>.
8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

   a. lightning;

   b. peak gust wind speed exceeding <Insert mph (m/sec)>;
   c. fire;
   d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. vapor condensation on bottom of roofing; and

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work
8. according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories: Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fascia, soffits, reveals, and fillers.

1. Roof-drainage systems- downspout and gutters.
2. Metal facing.
3. Exposed trim
4. Copings.
5. Metal flashing.

B. Related Sections:

1. Division 1 Section "Submittal Procedures" for submittal requirements.
2. Division 1 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 1 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
4. Division 6 “Architectural Woodwork” for acoustic wood soffit panels
5. Division 7 Section "Metal Roof Panels" for other flashing and trim materials associated with the roofing system and roofing underlayment.
6. Division 7 Section "Metal Wall Panels" for other flashing and trim materials associated with this metal wall system.
7. Division 7 Section "Exterior Siding and Trim" for trim materials associated with HPL siding system.
8. Division 7 Section "Polyvinyl-Chloride Roofing" for other flashing and trim materials associated with this metal wall system.
9. Division 7 Section “Flexible Flashing” for self-adhesive flashing material.
10. Division 7 Section “Weather and Air Barrier” for water-resistive weather air barrier and flashing applied over wall sheathing.
11. Division 7 Section "Joint Sealants" for elastomeric sealants.
12. Division 9 Section "Painting" for painting of exposed sheet metal flashing and trim.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement and exposure to weather without failing.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data including manufacturer's material and finish data, installation instructions and general recommendations for each specified flashing material and fabricated product.

C. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

D. Shop Drawings of each item specified showing layout, profiles, methods of joining and anchorage details.

E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material, design and extent to that indicated for this Project and with a record of successful in-service performance.

1.7 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work and protection of materials and finishes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet Metal Materials: Furnish the following sheet metal materials:

1. Aluminum-Zinc Alloy-Coated Steel Sheet: prefinished, ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality, minimum 24 ga.(0.28 inch) thickness unless otherwise indicated.
   a. Exposed Finish: 3-coat Fluoropolymer; AAMA 621. Fluoropolymer finish containing less than 70 percent PVDF resin by weight in both color coat and clear top coat. Prepare, pretreat and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
   b. Concealed Finish: Apply pretreatment and manufacturer's standard white or light colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
   c. Colors as selected from manufacturer's full line of colors

2. Aluminum Sheets: prefinished, ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer with temper as required to suit forming operations, minimum 0.024 inch (0.6 mm) thick, unless otherwise indicated.
   a. Exposed Finish: 3-Coat Fluoropolymer; AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   b. Concealed Finish: Apply pretreatment and manufacturer's standard white or light colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
   c. Colors as selected from manufacturer's full line of colors

3. Metallic-Coated Steel Sheet – PVC Roofing Locations: Refer to Section 07 5419 - Polyvinyl- Chloride (PVC) Roofing, for sheet metal specifications and products, when installed directly adjacent and integrally with the PVC roofing membrane systems.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Downspout Strainer: Removable basket type at each downspout head.

B. Fasteners: Same metal as sheet metal flashing or other non-corrosive metal as recommended by: sheet metal manufacturer. Match finish of exposed heads with material being fastened.

C. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.

D. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, nondrying, non-migrating sealant.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

F. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.

G. Paper Slip-Sheet: 5-lb/square (0.244 kg/sq. m) red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.

H. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of Work, matching or compatible with material being installed; non-corrosive; size and thickness required for performance.

2.3 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

E. Expansion Provisions: Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, non-corrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Gutters and metal facing, drip edge copings and eave flashing fabricated from sheet metal stock in continuous sections as to provide a seamless length as follows:

C. Gutters: Continuously formed with profile as indicated.

1. Aluminum-Zinc Alloy-Coated Steel Sheet.
2. Thickness: 22 gauge. (0.034 inch)
3. Color: As selected by Architect from manufacturer's full range of standard, premium and metallic colors options.(provide 2-color options to match metal wall panels and metal composite material wall panels)

D. Downspout: Steel sheet matching wall panel material per Section 07 42 63.

1. 3”x4” Square Continuous length
2. Color as selected by Architect to match metal wall panels.

E. Scupper and Header boxes: Steel sheet matching wall panel material per Section 07 4263.

1. Color as selected by Architect to match metal wall panels.

F. Splash Pans: Fabricate from the following material:

1. Aluminum-Zinc Alloy-Coated Steel Sheet.
2. Thickness: 24 gauge 0.0276 inch (0.7 mm) thick.
3. Color as selected by Architect.

G. Copings: Fabricate from the following material:

1. Aluminum-Zinc Alloy-Coated Steel Sheet.
2. Color as selected by Architect.

H. Sheet Metal Flashing: not indicated below, Fabricate from the following material:

1. Aluminum-Zinc Alloy-Coated Steel Sheet.
2. Thickness: 24 gauge 0.0276 inch (0.7 mm) thick.
3. Color as selected by Architect.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

I. Metal Window Flashings: Job-cut to sizes and configurations required of material as required.

1. Prefinished Aluminum Sheet: 0.0201 inch (0.51 mm) thick.
2. Color as selected by Architect.

J. Metal Window Sill Flashings: Job-cut to sizes and configurations required of material as required.

1. Stainless Steel Sheet: 0.035 inch (0.89 mm) thick.

K. Roof-Penetration and Other Roof Flashing: Fabricate from the following material:

1. Prefinished Aluminum-Zinc Alloy-Coated Steel Sheet.
2. Thickness: 24 gauge 0.0276 inch (0.7 mm) thick.

L. Metal Drip Edge: Brake-formed sheet metal as detailed. Furnish the following material in lengths of 10 or 12 feet (2.5 to 3 m).

1. Prefinished Aluminum-Zinc Alloy-Coated Steel Sheet.
2. Color as selected by Architect.

M. Vent Pipe Flashing: Lead conforming to ASTM B 749, Type L51121, at least 1/16 inch (1.6 mm) thick, unless otherwise indicated. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof extending at least 4 inches (100 mm) from pipe onto roof. Painted color per Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except where pretinned surface would show in finished Work.

1. Do not solder the following metals: Aluminum.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

E. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

1. Use joint adhesive for nonmoving joints specified not to be soldered.

F. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

G. Separations: Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Counter Flashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches (50 mm) and bed with sealant.

I. Copings: Coordinate installation of roofing, water resistant weather barrier and flashing installation.

J. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Connect downspouts to underground drainage system indicated with Fernco Polypropylene Downspout Connector (adapter) or equal.
    a. Coordinate downspout size and drainage pipe size.

K. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.

L. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:

1. Install EDPM pipe flashing per manufacturer's recommendations.
2. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Self-adhering membrane flashing.

B. RELATED SECTIONS

1. Section 01 33 00 - Submittal Procedures
2. Section 01 8113 - "Sustainable Design Requirements" for applicable Sustainability requirements.
3. Division 01 Section "Quality Requirements" for Building Envelope Consultant.
4. Section 07 27 26 – WRB Weather and Air Barriers
5. Section 07 62 00 – Sheet Metal Flashing and Trim
6. Section 07 92 00 – Joint Sealants

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data

1. Submit manufacturer's literature for self-adhering membrane flashing.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements in Manufacturer's written instructions.

B. Deliver materials to site in unopened containers with visible labels.

C. Storage and Protection:

1. Store products within manufacturer's required temperature and humidity ranges.
2. Prior to use, condition products within manufacturer's required temperature and humidity ranges.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Apply flashing when the following are within the manufacturer's limits during and for 4 hours after membrane installations:

a. Ambient and surface temperatures.
b. Relative humidity.

2. Do not apply to wet surfaces

1.7 Quality Assurance:

A. Manufacturer Technical Representative shall be on-site during the beginning of Wet-Flash installation to verify proper application procedures and assist with initial installation as necessary.

B. Warranty:

C. Manufacturer standard materials warranty.

D. Applicators 2 year labor and materials water-tight warranty

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. High Temperature Self-Adhering Membrane Flashing: Grace Construction Products

B. Foil Faced Self-Adhering Membrane Flashing: Protecto Wrap

2.2 MATERIALS

A. Foil-Faced Self-Adhering Membrane Flashing:

1. Basis of design: Provide Protecto Wrap, Protecto Safseal 45 Butyl self-adhered flashing or similar product subject with requirements.

a. Reference Standards:
b. Cold applied self-adhered waterproofing membrane with cross-laminated high density polyetheylene film laminated to a aluminum foil for UV resistance and weatherability, coated on one side with a high temperature proprietary recycled butyl adhesive.
c. Thickness: 45 Mil
d. Tensile Strength: 400 psi (ASTM D412)
e. Permeance: < 0.05 perms

B. High Temperature Self-Adhering Membrane Flashing:

1. Basis of design: Provide Grace "Ultra" Butyl self-adhesive flashing or similar product subject to compliance with requirements:

a. Reference Standards: ASTM D412, ASTM D903, ASTM D1970, ASTM D3767, ASTM E96, ASTM E108

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Cold applied, self-adhering membrane underlayment composed of high strength polyethylene film coated on one side with a layer of butyl rubber adhesive and interwound with a disposable release sheet.
c. Thickness: 30 mil.
d. Tensile strength: 250 psi.
e. Elongation: 250%.
f. Low temperature flexibility: unaffected at -20 degrees F.
g. Adhesion to plywood: 3 lb/inch width
h. Permeance: 0.05 perms max.
i. Material weight: 0.22 lbs/sq. ft.

C. Accessories (for foil faced self-adhering membrane flashing)

1. Water Based Primer:

a. Basis of Design: Protecto Wrap “Protecto Universal Water Based Primer”

2. Solvent Based Primer

a. Basis of Design: Protecto Wrap “BT Primer”

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare surface per manufacturer’s requirements. The surface must be prepared by ensuring a flush, level, smooth, clean and dry surface suitable for application of the flashing material.

B. Provide proper protection, heat and ventilation, required for proper installation.

3.2 INSTALLATION

A. General: Installation shall be in strict accordance with the manufacturer’s installation instructions, these project documents, and industry standards. When in conflict use most stringent application guideline.

B. High Temperature Self-Adhering Membrane Flashing:

1. Install at locations shown on the drawings or where specified
2. Apply in dry conditions when temperature of air and materials are above 40 degrees F.
3. Apply primer recommended by the manufacturer if adhesion conditions are marginal.
4. Cut membrane to size and peel the release liner back, and press in place with heavy hand pressure and hand roller.
5. Install so that all laps shed water.
6. Seal all edges and laps at through-wall flashing locations with manufacturer approved sealant.

C. Foil Face Self-Adhering Membrane Flashing:

1. Install at locations shown on the drawings or where specified
2. Product must be stored in original containers in warm dry area between 50 deg F to 90 deg F. Product must be kept warm a minimum of 24 hours prior to and just up to installation.
3. Primer shall be used prior to application of membrane.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Field test all substrates for adhesion prior to full application.

3.3 QUALITY CONTROL

A. General Contractor and manufacturers Technical Representative to continually review and supervise installation to insure a weather tight installation.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof Access Hatches
    a. Safety Post
    b. Safety Railing System
2. Fall Protection Horizontal Lifeline System
3. Roof Access Ladders

B. Related Sections:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 05 Section "Metal Fabrications" for metal vertical ladders for access to roof hatches.
4. Division 05 Section "Metal Fabrications" for blocking and steel anchorage requirements.
5. Division 07 Section PVC Roofing.
6. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Shop Drawings: Include plans, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer registered in the State in which the project is located, responsible for their preparation.

E. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Dimension locations of all items specified in this Section.
2. Method of attaching to roof or building structure.
3. Required clearances.

F. Fall Protection Specific

1. In-house Test Reports: Indicate anchor fabrication compliance with performance requirements.
2. Signage: Provide laminated sign showing system layout and usage notes, to be installed at roof access locations.

G. Maintenance Data: Written instructions for maintenance of devices to be included in the operation and maintenance manual.

H. Warranty: Sample of special warranty.

1.6 COORDINATION

A. Coordinate Truss design and submittal and blocking requirements with Fall Restraint Design and submittal.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.7 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard warranty on form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

PART 2 - PRODUCTS

2.1 ROOF HATCHES

A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, and integrally formed deck-mounting flange at perimeter bottom.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Babcock-Davis.
2. Bilco Company (The).
3. J. L. Industries, Inc.
4. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
5. Or approved equal.

C. Roof Hatch:

1. Basis-of-Design Product: Subject to compliance with requirements, provide JL Industries Model RHA Series roof hatches with weather resistant EPDM gasketing and Safety Ladder Assist Post., or comparable product by one of the following:
2. Type and Size: Single-leaf lid, 30 by 36 inches.
3. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) external live load and 20-lbf/sq. ft. internal uplift load.

4. Construction:

a. Hatch Material: Aluminum sheet, 0.090 inch (2.28 mm) thick

b. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.

c. Curb: .090" aluminum. 12" high curb with 3-5/8” wide flange including holes for securing to roof deck. (Curb includes integral counter flashing).

d. Stainless Steel Hardware: Hinges, exterior handle, inside locking handle

1) Linkage: Heavy gauge automatic hold open arm with red vinyl grip for opening and closing.
2) Closure: Compression operated, shock absorbing cylinder.
3) Latch: Exterior handle, inside locking handle with interior and exterior padlock hasp.

e. Finish: Manufacturer's standard powder coat.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.

1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
2. Height: 42 inches (1060 mm) above finished roof deck.
3. Material: Steel tube.
4. Finish: Manufacturer's standard powder coat.

2.2 FALL PROTECTION HORIZONTAL LIFELINE SYSTEM:

A. Delegated Design: Provide fall protection system manufactured by Guardian Fall Protection Inc., 6305 South 231st Street Kent, WA, phone 800-466-6385, fax 800-670-7892, or equal.

B. System Description:

1. General: Provide structural fall restraint and fall arrest system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes. Provide fall protection system permanently attached to roof structure. Provide cable lifeline system to allow continuous travel between anchor points.
2. Design Requirements: Anchors and accessories comprising system of following types:
    a. Guardian CB Anchors, spaced as indicated by manufacturer, for safety snap connection by individual workers capable of withstanding a 5,000 pound load or safety factor of 2 meeting the requirements of OSHA 1926.502(d)(8).
    b. Cable lifeline to pass through intermediate anchor attachment points, restrained at either end by steel shackle and cable fist grips; detaching and reattaching to the system at intermediate anchors required.
    c. In-line shock absorber; 1 each for total lifeline span length up to 60’ and 2 each for total lifeline span length greater than 60’ and up to 100’.
3. Performance Requirements: System and components tested for the resistance of the following loads:
    a. Fall Restraint: 4 Users
    b. Fall Arrest: 2 Users
    c. Design fall protection anchors to resist a 5,000 pound load applied in any direction at maximum anchor height or provide engineered system designed meeting the requirements of OSHA 1926.502(d)(8).
    d. Design system to limit loads on horizontal lifeline anchors to 2,500 pounds.

C. Quality Assurance

1. Manufacturer Qualifications: Firm having at least 10 years continuous experience in manufacturing fall safety equipment similar to systems specified and exhibiting records of successful in-service acceptability and performance. Firm must employ personnel dedicated to provide regularly scheduled Authorized and Competent Person Training courses as mandated by OSHA 1926 and 1910 for owner’s authorized safety personnel.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of roof anchors that are similar to those indicated for this Project in material, design and extent.
3. OSHA Standards: Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR § 1926.500 Subpart M (Fall Protection), and with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.
4. Source Limitations: Obtain all roof anchors through one source from a single manufacturer.
5. Testing: Perform quality control tests for each system per manufacturer's requirements.

D. Coordination

1. Contractor to coordinate installation of structural deck to meet requirements of roof anchor manufacturer.
    a. Anchors are to be attached directly to Structural steel as detailed for weld-on connection: structure must be capable of supporting a 5,000 pound ultimate load.
2. Contractor to coordinate installation of structural deck and reinforcements and anchorages to receive fall protection anchors.
3. Contractor to coordinate placement of roofing system, insulation and flashing to ensure water-tight integrity to roof.

E. Warranty

1. Provide manufacturer's standard warranty to guarantee products will be free from defects for a period of 12 months. Warranty period shall become effective on date of substantial completion.

F. Materials

1. CB anchor post: 2-1/2" schedule 80 pipe, galvanized steel (size as necessary for height).
2. CB anchor U-bar: 5/8" diameter U-bar, galvanized steel.
3. CB anchor base plate: galvanized steel.
4. Absorbinator Kit: galvanized steel.
5. Lifeline cable: 3/8" diameter, galvanized steel.

G. Manufactured Assemblies

1. Guardian CB-18 Galvanized Roof Anchors.
2. Guardian Absorbinator Horizontal Lifeline kit: Each kit consisting of 1 or 2 shock absorbers, 1 turnbuckle, 2 or 3 shackles, 6 cable fist grips, 2 thimbles, and 2 O-rings. Provide additional O-rings as recommended by manufacturer.
3. Lifeline: Continuous wire rope as tested by fall protection device manufacturer to permit worker mobility and safety.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. Fabrication

1. Fabricate work true to dimension, square, plumb, level, and free from distortions or defects detrimental to appearance and performance.
2. Prepare, treat and coat galvanized metal to comply with manufacturer's written instructions. Prepare galvanized metal by removing grease, dirt, oil, flux, and other foreign matter.

2.3 ROOF ACCESS LADDER

A. Manufacturer

1. Basis-of-Design Product: Subject to compliance with requirements, provide O'Keeffe's Inc, - Address: 100 N Hill Drive, Suite 12, Brisbane, CA 94005 Phone: 888.653.3333; Website: http://okeeffes.com/contact-us/

B. Materials

1. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
2. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

C. Fabrication:

1. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18–3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
2. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
3. Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.
4. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.
5. Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
6. Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads

D. Finishes:

1. Clear Anodic Finish: AA-M10C22A41 Mechanical finish as fabricated. Architectural Class I, clear coating 0.018 mm or thicker.

E. Tubular Rail Low Parapet Access Ladder with Roofover Rail Extension.

1. Model 502 as manufactured by O'Keeffe's Inc.

F. Tubular Rail Low Parapet Access Ladder with Platform and Return.

1. Model 503 as manufactured by O'Keeffe's Inc.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, verify conditions comply with structural requirements for proper system performance, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Roof-Hatch and Floor Door Installation:

1. Anchor securely to structure. Install in heavy mastic sealant directly to roof deck for a weather-tight installation.
2. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
3. Attach ladder-assist post according to manufacturer's written instructions.

C. Installation of Anchor Posts and Absorbinator Lifeline system to be performed by contractor according to manufacturer’s instructions and recommendations.

1. Provide manufacturer’s inspection and certifcation during or after lifeline installation to provide verify that the system has been installed correctly.
2. Provide Test on site 100% of anchors relying upon chemical adhesive fasteners using load cell test apparatus in accordance with manufacturer's written recommendations

D. Roof Access Ladder

1. Coordinate anchorages. Furnish setting drawings, templates and anchorage structural loads for fastener resistance
2. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding
4. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.
5. Protect installed products until completion of project
6. Touch-up, repair or replace damaged products before Substantial Completion

3.3 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Division 09 painting Sections.

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Clean off excess sealants.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1. Walls and partitions.

B. Related Sections include the following:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 07 Joint Sealants for exterior and interior joint sealants and for firestop sealant at Training Tower.
3. Division 07 Fire Resistive Joint System
4. Division 21, 22, 23 Sections specifying duct and piping penetrations.
5. Division 26, 27 & 28 Sections specifying cable and conduit penetrations.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. F-Rated or T-Rated Systems: Provide through-penetration firestop systems with ratings, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 3300

B. Product Data: For each type of through-penetration firestop system product indicated.

C. LEED Submittal:

1. Product Data for Credit EQ 4.1: For fire-resistive joint systems, including printed statement of VOC content.

D. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:

   a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
   b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

      1) UL in "Fire Resistance Directory."
      2) ICBO Evaluation report for fire resistive construction

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturers written instructions by natural means or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 2 - PRODUCTS

2.1 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fillers for sealants.
2. Collars.
3. Steel sleeves.

2.2 FILL MATERIALS

A. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

D. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

E. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.3 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes joint sealants for, but not limited to, the following locations:

1. Exterior Building Elements:

a. Joints and cracks around windows.
b. Fiberglass entrances.
c. Door frames.
d. Columns.
e. Louvers.
f. Wall penetrations.
g. Connections.
h. Other joints necessary to seal off building from outside air and moisture.
i. Exterior unit masonry and concrete joints
j. Metal Panel Siding
k. HPL Wall Panel
l. Exterior trim elements.
m. Control and expansion joints in cast-in-place concrete.
n. Roof vents and flues.

2. Exterior Sheet Metal and Miscellaneous:

a. Penetrations and joints in roof and fascias.
b. Flashings.
c. Gutters and downspouts.

3. Interior:

a. Inside jambs and heads of exterior door frames.
b. Both sides and tops of interior door frames.
c. Inside perimeters of windows.
d. Perimeter edges of acoustical ceiling.
e. Exposed edges below plastic laminate window sills.

4. Interior joints at Moisture Areas:

a. Countertops and backsplash to wall.
b. Sinks to countertops.
c. Termination and perimeter joints in showers.
d. Perimeter joints of plumbing fixtures to wall.
e. Perimeter of ceramic and/ or porcelain tile
f. Perimeter joints at service sinks.

5. Interior Acoustical Sealants:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Perimeter joints in sound insulated walls and rooms.
b. Perimeter edge of Acoustical Panel Ceiling.
c. Between sill palate and subfloor at sound walls

6. Interior Concrete Floors:

a. Control and expansion joints in cast-in-place concrete slabs.
b. Other joints as required.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section “Sustainable Design Requirements”, for applicable requirements.
2. Division 01 Section “Quality Requirements” for Building Envelope Consultant.
3. Division 1 Section for submittal requirements.
4. Division 3 Section “Cast in Place Concrete” for liquid joint sealant at interior slab.
5. Division 7 Section "Fluid Applied Water Resistive Barrier"" for Air Barrier sealant
6. Division 7 Section “PVC Roofing” for sealants at roofing system
7. Division 7 Section "Sheet Metal Flashing and Trim" for sealing joints related to flashing and sheet metal for roofing and wall panels manufactured roof panels and manufactured wall panels.
8. Division 7 Section "Through Penetration Fire Stopping" for through-penetration fire stopping systems.
9. Division 8 Section "Glass and Glazing" for sealants used in glazing.
10. Division 9 Section "Gypsum Board" for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.
11. Division 32 Section “Concrete Paving” For premolded filler

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

B. Provide fire rated joint sealants in fire rated wall and ceiling assemblies as noted

1.5 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 specification section, "Submittal Procedures".

B. Product data from manufacturers for each joint sealant product required.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Sustainable Design Submittals:

1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

D. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation complies with local regulations controlling use of volatile organic compounds.

E. Certification from manufacturer indicating date of manufacture.

F. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated and compatible with specified substrates.

G. Qualification Data: For qualified Installer.

H. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

I. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

B. Testing will not be required when joint sealant manufacturer is able to submit joint preparation data required above that are acceptable to Architect and are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants or other causes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Handle to prevent inclusion of foreign matter.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4.4 deg C).
2. When joint substrates are wet or frozen.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.9 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Colors: Provide color of exposed joint sealants to comply with the following:

1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
2. Provide custom matched color sealants at the following locations and where indicated:
    a. Cabinets
    b. Interior slab
    c. Siding
    d. Windows

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class and Uses.

B. Available Products: Subject to compliance with requirements, elastomeric sealants that may be incorporated in the Work include, but are not limited to, the products specified in each Elastomeric Sealant Data Sheet.

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Products: Flexible polyurethane or polyolefin rod or bond breaker tape as recommended by sealant manufacturer for joints being sealed.

2.4 PREMOLDED JOINT FILLER

A. General: Provide joint filler material that are non-staining and compatible with joint sealants and primers and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Width: 1/2"-inch or as shown on drawings
2. Depth: Equal to slab thickness

B. Products: Flexible, compressible polyethylene, closed cell joint filler.

1. W.R. Meadows; Deck-O-Foam
2. NMW, Inc; Foamtech
3. Sweeney Materials, inc.; EXP 100/200
4. Or Approved equal.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

D. Masonry Joint Sand: Match masonry mortar joints

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt and frost.
2. Clean concrete and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates or where recommended by joint sealant manufacturer. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.

1. Install on both sides of acoustical wall intersections at sill to floor, wall to ceiling, wall to wall intersections.
2. Install at all acoustical wall penetrations.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
    a. Do not leave gaps between ends of joint fillers.
    b. Do not stretch, twist, puncture or tear joint fillers.
    c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
    d. Polyurethane rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing.
2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

F. Tooling of Non-sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration recommended by manufacturer, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Masonry Joint Sealant: Apply sand to joints to match mortar joints in appearance.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION
(See Joint Sealant Data Sheet following this section)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

A. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Silicone Joint Sealant: General Exterior building elements.

2. Base Polymer: Neutral-curing silicone.

3. Type: S single component

4. Grade: NS (non-sag).

5. Class: 100/50.

6. Additional Movement Capability: 50 percent movement in extension and 50 percent in compression for a total of 100 percent movement.

7. Uses Related to Exposure: NT (non-traffic).

8. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

   a. Use O Joint Substrates: Coated glass, color anodized aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, granite, limestone, marble, ceramic tile, and wood.

9. Available Products:

   a. Sealant:

      1) Dow Corning; Sealant 790
      2) Pecora Corporation; 864 NTS
      3) Or Approved Equal

   b. Primer per manufacture's requirements.

B. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Silicone Joint Sealant: Exterior metal.

2. Base Polymer: Neutral-curing silicone.

3. Type: S single component.

4. Grade: NS (non-sag).

5. Class: 25.

6. Uses Related to Exposure: NT (non-traffic).

7. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

   a. Use O Joint Substrates: Coated glass, color anodized aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, granite, limestone, marble, ceramic tile, and wood.

8. Available Products:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Sealant:

1) Dow Corning; Sealant 799
2) Or Approved Equal

b. Primer per manufacture's requirements.

C. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Silicone Joint Sealant: Interior general.

2. Base Polymer: Neutral-curing silicone.

3. Type: S single component.

4. Grade: NS (non-sag).

5. Class: 50.

6. Uses Related to Exposure: NT (non-traffic).

7. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Coated glass, color anodized aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, granite, limestone, marble, ceramic tile, and wood.

8. Available Products:

a. Sealant:

1) Dow Corning; Sealant 791
2) Pecora Corporation; AC-20
3) Sika Corporation, Construction Products Division; SikaSil-N Plus
4) Or Approved Equal

b. Primer per manufacture's requirements.

D. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Silicone Joint Sealant: Perimeter Edges of Acoustical Ceiling

2. Base Polymer: Neutral-curing silicone.

3. Type: single component.

4. Grade: NS (non-sag).

5. Class: 25.

6. Uses Related to Exposure: NT (non-traffic).

7. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Coated glass, color anodized aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, granite, limestone, marble, ceramic tile, and wood.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

8. Available Products:
   a. Sealant:
      1) Dap; Alex Plus 18101
      2) Or Approved Equal

E. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Silicone Joint Sealant: Interior Joints at moisture areas.
   a. mildew resistant
2. Base Polymer: Neutral-curing silicone.
3. Type: S (single component).
4. Grade: NS (non-sag).
5. Class: 25.
6. Additional Movement Capability: 25 percent movement in extension and 25 percent in compression for a total of 50 percent movement.
7. Uses Related to Exposure: NT (non-traffic).
8. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
   a. Use O Joint Substrates: Coated glass, color anodized aluminum, aluminum coated with a high-performance coating, galvanized steel, and ceramic tile.
9. Available Products:
   a. Sealant:
      1) Dow Corning; Sealant 786 mildew resistant.
      2) Pecora Corporation; 898
      3) Or Approved Equal
   b. Primer per manufacture's requirements.

F. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Urethane Joint Sealant: General Exterior Concrete and Masonry.
2. Base Polymer: Nonsag Urethane – Chemical Resistant
3. Type: Single Component
4. Grade: NS
5. Uses Related to Exposure: T, NT.
6. Uses Related to Joint Substrates: I
7. Available Products:
   a. Sealants:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1) Vulkem 116, Tremco
2) Sikaflex-1a; Sika Corporation, Construction Products Division.
3) Master Seal NP1, BASF
4) or Approved Equal

b. Primers: Product recommended by joint manufacturers where required for sealant adhesion to joint substrates indicated.

G. ELASTOMERIC JOINT SEALANT DATA SHEET

1. Urethane Joint Sealant: Exterior Exposed Concrete Paving.

2. Base Polymer: Pourable Urethane – Chemical Resistant

3. Type: Single Component, Self-leveling

4. Grade: P

5. Uses Related to Exposure: T (traffic).

6. Uses Related to Joint Substrates: I

7. Available Products:

a. Sealants:

1) Vulkem 45, Tremco
2) Sikaflex-1c SL; Sika Corporation, Construction Products Division.
3) Master Seal SL1, BASF
4) or Approved Equal

b. Primers: Product recommended by joint manufacturers where required for sealant adhesion to joint substrates indicated.

H. ACCOUSTICAL SEALANT DATA SHEET

1. Acoustical Joint Sealant: Interior acoustical sealants.

2. Base Polymer: Non-hardening Synthetic Rubber.

3. Type: single component.

4. Available Products:

a. Tremco; Acoustical Sealant.
b. Pecora Corporation; AC-20 FTR
c. Or Approved Equal

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.
2. Sidelight and transom frames.
3. Borrowed-light frames (relites).
4. Fire-rated door and frame assemblies.
5. Insulation in hollow metal frames.

B. Related Sections:

1. Section 01 81 13, Sustainable Design Requirements, for applicable requirements.
2. Division 07 Sections for caulk and sealants around door frames.
3. Division 07 Sections for Flexible Flashing.
4. Division 08 Sections for wood doors installed in hollow metal frames.
5. Division 08 for glazing in glazed openings in doors and frames.
6. Division 08 Section for door hardware and weatherstripping for hollow metal doors.
7. Division 09 Sections for field painting hollow metal doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.4 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, performance values, fire-resistance rating and finishes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

D. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

F. Maintenance Data: To include in maintenance manuals.

G. Warranties: Sample of warranties specified in this section to be included in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Hollow Metal Frames: Basis of-Design Product: Subject to compliance with requirements, provide MU series as Manufactured by Steelcraft, an Allegion company or comparable product by one of the following:

1. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Or approved equal.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 (ZF120) metallic coating (paintable galvannealed).

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

H. Glazing: Comply with requirements in Division 08 Section "Glazing."

2.4 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Flush panel.

2. Core Construction: Manufacturer's standard polyisocyanurate and polystyrene cores.

a. Fire Door Core: As mineral core required to provide fire-protection ratings indicated.

b. Exterior Doors and Doors Opening Onto the Apparatus Bay (including interior doors into Apparatus bay):

1) Manufacturer's standard polyisocyanurate and polystyrene core. Provide doors fabricated with the following performance values:

a) Air Infiltration Value of 0.20 per NFRC 400

b) Solar Heat Gain Coefficient (SHGC) at Doors with less than 50% Glazing: Average Unit SHGC of not more than **0.40** maximum.

c) Solar Heat Gain Coefficient (SHGC) at Doors with 50% or more of Glazing: Average Unit SHGC of not more than **0.40** maximum.

d) Thermal Transmittance at Doors with less than 50% Glazing: NFRC 100 maximum whole-window U-factor of **0.37 Btu/sq. ft. x h x deg F (3.43 W/sq. m x K)** maximum.

e) Thermal Transmittance at doors with 50% or more of Glazing: NFRC 100 maximum whole-window U-factor of **0.60 Btu/sq. ft. x h x deg F (1.71 W/sq. m x K)** maximum.

c. Interior Door Core: Polystyrene core.

3. Vertical Edges for Single-Acting Doors: Beveled edge.

a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Top and Bottom Edges: To be flush. Closed with flush, inverted 0.042-inch- (1.0-mm) thick, end closures or channels of same material as face sheets.
5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors and Doors Opening Onto the Apparatus Bay (including interior doors into Apparatus bay): Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Exterior Doors and Doors Opening Onto the Apparatus Bay (including interior doors into Apparatus bay):

   a. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
   b. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

   a. Materials: Cold-rolled steel sheet, minimum thickness of 0.042-inch- (1.0-mm).

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.5 STANDARD HOLLOW METAL FRAMES

A. ANSI/NAAMM-HMMA 861 ANSI/SDI A250.8

B. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

C. Exterior Frames and Frames Opening Onto the Apparatus Bay (including interior door frames and barrowed lights into Apparatus bay):

1. Fabricated from metallic-coated steel sheet.
2. Fabricate frames with mitered or coped corners.
3. Fabricate frames as full profile welded unless otherwise indicated.
4. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
5. Frames for Borrowed Lights: 0.053-inch- (1.3-mm-) thick steel sheet.
6. Provide thermal break frames subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.

D. Interior Frames: Fabricated from cold-rolled steel sheet.

1. Fabricate frames with mitered or coped corners.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Fabricate frames as full profile welded unless otherwise indicated.

3. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
4. Frames for Wood Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
5. Sidelight and Transom Frames: Fabricated from same material and thickness as adjacent door frame.
6. Frames for Borrowed Lights: 0.053-inch- (1.3-mm-) thick steel sheet.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

F. General: Fabricate frames of construction indicated. Close contact edges of corner joints tight with faces mitered and stops butted or mitered. Continuously weld faces and soffits and finish faces smooth. Comply with ANSI/NAAMM-HMMA 861.

1. Door Frames for Openings 48 Inches (1219 mm) Wide or Less: Fabricated from 0.053-inch- (1.3-mm-) thick cold-rolled steel sheet.
2. Door Frames for Openings More Than 48 Inches (1219 mm) Wide: Fabricated from 0.067-inch- (1.7-mm-) thick cold-rolled steel sheet.
3. Sidelight and Transom Frames: Fabricated from same material and thickness as adjacent door frame.
4. Borrowed-Light Frames: Fabricated from 0.053-inch- (1.3-mm-) thick cold-rolled steel sheet.

G. Exterior Frames and Frames Opening Onto the Apparatus (including interior door frames into Apparatus bay):

1. Provide thermal break frames subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.

a. Door Frames for Openings 48 Inches (1219 mm) Wide or Less: Fabricated from 0.053-inch- (1.3-mm-) thick metallic coated steel sheet.
b. Door Frames for Openings More Than 48 Inches (1219 mm) Wide: Fabricated from 0.067-inch- (1.7-mm-) thick metallic coated steel sheet.
c. Sidelight and Transom Frames: Fabricated from same material and thickness as adjacent door frame.
d. Borrowed-Light Frames: Fabricated from 0.053-inch- (1.3-mm-) thick cold-rolled steel sheet..

H. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 861 with reinforcing plates from same material as frame.

I. Head Reinforcement: Provide minimum 0.093-inch- (2.3-mm-) thick, steel channel or angle stiffener for opening widths more than 48 inches (1219 mm).

2.6 FRAME ANCHORS

A. General: Anchors located at exterior door frames are to be hot-dipped galvanized coated steel.

B. Jamb Anchors:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

C. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.7 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. 2-Way Corners: Provide fully welded 2-way corners where indicated on plans.

C. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- (6.4-mm-thick by 25.4-mm-) wide steel.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

a. Install Top U-channel inverted, flush with top of door.

2. Glazed Lites: Factory cut openings in doors.

3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Metal Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) high.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
        5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.

    b. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    c. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from steel sheet matching door face material

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive, mortised and surface-mounted door hardware.

    a. **Through bolted hardware is not allowed**.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
3. Provide loose stops and moldings on inside of hollow metal work.
4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.10 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Insulation: Prior to installing frame, solidly pack mineral-fiber insulation inside all hollow metal frames at all locations to completely fill the space inside the frame. **(Insulation shall not be loosely installed)**
2. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    a. At fire-protection-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable glazing stops located on secure side of opening.
    d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
5. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Non-Fire-Rated Standard Steel Doors:

   a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
   b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
   c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
   d. Between Bottom of Door and Top of Finish Floor (No Threshold): 3/8 inch (9.5 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove extraneous material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

B. This Section includes the following:

1. Solid-core doors with wood-veneer faces.
2. Fire rated doors
3. Sound-retardant doors
4. Factory fitting flush wood doors to frames and factory machining for hardware.
5. Factory finish on doors.

C. Related Sections include the following:

1. Section 01 81 13, Sustainable Design Requirements, for applicable requirements.
2. Division 08 Section "Hollow Metal Doors and Frames" for frames associated with wood doors.
3. Division 08 Section "Glazing" for glass view panels in flush wood doors.
4. Division 08 Section “Finish Hardware” for door hardware.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

1. LEED Submittals:

a. Certificates for Credit MR 7: Chain-of-custody certificates certifying that flush wood doors comply with forest certification requirements. **Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.**

b. Include statement indicating costs for each certified wood product.

c. Product Data for Credit EQ 4.4: For adhesives and composite wood products, documentation indicating that product contains no urea formaldehyde.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate Hardware blocking locations
3. Indicate dimensions and locations of cutouts.
4. Indicate requirements for veneer matching.
5. Indicate doors to be factory finished and finish requirements.
6. Indicate fire-protection ratings for fire-rated doors.

D. Samples for initial selection:

1. Factory-Finished Doors: Provide samples of manufacturer's available finishes and stain colors.

E. Samples for final acceptance:

1. Faces of Factory-Finished Doors: Provide sample of actual door veneer species specified with selected finish applied.

F. Maintenance Data: To include in maintenance manuals.

G. Warranties: Sample of warranties specified in this section to be included in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following

1. Marshfield Door Systems, Inc.
2. Algoma Hardwoods, Inc.
3. Eggers Industries
4. Graham Wood Doors
5. Oregon Door.
6. VT Industries Inc.
7. Or Approved Equal

2.2 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty

C. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2

a. Use non-VOC adhesives
b. Composite Wood and Agrifiber materials that contain no added urea-formaldehyde.
c. Bonded Core.

2. Blocking: Provide wood blocking in particleboard-core doors as follows:

a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers to eliminate need for through bolting of hardware.
b. 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
2. Blocking: Provide manufacturer's hardware blocking for fire rated doors in mineral-core doors as follows:

   a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers to eliminate need for through bolting of hardware.
   b. 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
   c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors

1. Grade: Premium, with WDMA Grade A faces

   a. No visible gaps between veneers

2. Species: White Maple
3. Cut: Plain-Sliced
4. Match between Veneer Leaves: book match.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Exposed Vertical and Top Edges: Same species as faces or a compatible species.
8. Core: Particleboard (Agrifiber)
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.

2.4 SOUND-RETARDANT DOORS

A. Sound-Retardant Doors:

1. WDMA I.S.1-A Performance Grade: Extra Heavy Duty
2. Grade: Premium, with WDMA Grade A faces

   a. No visible gaps between veneers

3. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.
4. STC Rating: 40.
5. Core: Sound absorbent material encapsulated by stiles, rails, crossbands, and face veneers.
6. Perimeter Gasketing and Drop Seals: To achieve STC ratings.
7. Face Veneers and Vertical Stile Edges: Matching.
8. Acoustical Lite Kit: Metal vision panel.
9. Veneers:

   a. Apply to crossbanded core in hot press using Type I, exterior, water-resistant adhesive.
   b. Species: White Maple.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

c. Cut: Quarter-Sliced.
d. Match between Veneer Leaves: Book.
e. Assembly of Veneer Leaves on Door Faces: Running match.
f. Minimum Thickness Before Sanding: 1/42 inch.
g. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
h. Exposed Vertical and Top Edges: Same species as faces or a compatible species.

2.5 LOUVERS AND LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.

1. Wood Species: Same species as door faces
2. Profile: Manufacturer's standard shape.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

2.7 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

a. Top and bottom edges shall be sealed

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium Custom.
2. Finish: AWI System
3. Finish: WDMA TR-6 catalyzed polyurethane.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

4. Effect: Open-grain finish
5. Stain: As selected by the Architect from the manufacturer's full range.
6. Sheen: Satin

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Finish Hardware".

1. Through bolted hardware is not allowed.

B. Installation Instructions: Installation of wood doors to comply with WDMA IS 1A. Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Access doors and frames for walls and ceilings.

B. Related Sections include the following:

1. Section 01 81 13, Sustainable Design Requirements, for applicable requirements.
2. Division 09 Section "Gypsum Board"
3. Division 22 Section "Common Work Results for Plumbing" for Access doors associated with plumbing access.
4. Division 23 Section "Common Work Results for HVAC " for Access doors associated with access to HVAC equipment.
5. Division 23 Section "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings**,** materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

C. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

D. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.

B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.6 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

1. ASTM A 123/A 123M, for galvanizing steel and iron products
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

C. Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with A60 (ZF180) zinc-iron-alloy (galvannealed) coating or G60 (Z180) mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

E. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
    a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
4. Field Paint per section 09 91 00

F. Drywall Beads: Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Babcock-Davis; A Cierra Products Co.
2. J. L. Industries, Inc.
3. Milcor.
4. Or Approved Equal

B. Flush Access Doors and Frames with Exposed Trim: Fabricated from **steel** sheet.

1. Locations: Wall and ceiling surfaces.
2. Size: 22" x 30"
3. Door: Minimum 0.060-inch- (1.5-mm-) thick sheet metal, set flush with exposed face flange of frame.
4. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-)] [1-1/4-inch- (32-mm-) wide, surface-mounted trim.
5. Hinges: Continuous piano.
6. Latch: Cam latch operated by screwdriver with interior release.
7. Provide an allowance for up to (15) access panels

C. Exterior Flush Access Doors and Frames with Exposed Trim: Weatherproof with extruded door gasket.

1. Locations: Ceiling surfaces.
2. Door: Minimum 0.040-inch- (1.0-mm-) thick, metallic-coated steel sheet; flush panel construction with manufacturer's standard 2-inch- (50-mm-) thick fiberglass insulation.
3. Frame: Minimum 0.060-inch- (1.5-mm-)thick extruded aluminum.
4. Hinges: Continuous piano, zinc plated.
5. Lock: Dual-action handles with key lock.

D. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.

1. Locations: Wall and Ceiling surfaces.
2. Fire-Resistance Rating: Not less than that of adjacent construction
3. Temperature Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch (0.9 mm)
5. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
6. Hinges: Continuous piano.
7. Automatic Closer: Spring type.
8. Latch: Self-latching device operated by ring turn with interior release.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. Exposed Flanges: Nominal 1 to 1-1/2 inches (25 to 38 mm) wide around perimeter of frame.
2. Provide concealed mounting holes in frames for attachment of units to metal or wood framing.

a. Do not attach through exposed flange on exterior application

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder lock, furnish two keys per lock and key all locks alike.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes furnishing and installing a floor track supported, sliding-folding, thermally broken, aluminum-framed glass panel system that includes:

1. Aluminum frame
2. Threshold
3. Panels
4. Sliding-folding and locking hardware
5. Weather stripping
6. Glass and glazing
7. Insect screen (optional)
8. Accessories as required for a complete working installation.

B. Related Requirements:

1. Division 1 Section "Submittal Procedures" for submittal requirements.
2. Division 1 Section “Quality Requirements” for Owner’s Building Envelope Consultant.
3. Division 1 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
4. Division 7 Section "Joint Sealants" for joint sealants installed as part of aluminum entrance and storefront systems
5. Division 7 Section “Sheet Metal Flashing and Trim” for flashing of openings.
6. Section 08 41 13 "Aluminum Framed Entrances and Storefronts" for coordinating Brake metal finish on the building exterior.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

7. Section 08 54 13 "Fiberglass Windows" for coordinating finish among aluminum fenestration units on the building exterior.

8. Section 08 71 00 "Finish Hardware" for hardware not specified in Section 08 32 00.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions.

C. Sustainable Design Submittals:

1. Refer to Section 01 81 15, LEED Design Requirements.

2. LEED v4 for Building Design and Construction (BD+C) Credits. Complete online LEED forms and submit other required materials as follows:

a. Energy and Atmosphere (EA) Credits:

1) EA Credit 2 (EAc2): Optimize Energy Performance

b. Materials and Resources (MR) Credits:

1) MR Credit 1 (MRc1): Building Life-Cycle Impact Reduction; Option 3 - Building and Material Reuse

c. Indoor Environmental Quality (EQ) Credits:

1) EQ Credit 7 (EQc7): Daylight
2) EQ Credit 8 (EQc8): Quality Views
3) EQ Credit 9 (EQc9): Acoustic Performance

a) Submit calculations or measurements for occupant spaces to meet sound transmission class ratings between adjacent spaces and reverberation time requirements within a room.

D. LEED Closeout Documentation:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. LEED v4 (BD&C). Submit information and documentation to complete LEEDTM Worksheet Templates for the following credits:
    a. EAc2, MRc1, EQc7, EQc8, EQc9

E. Shop Drawings: For folding aluminum-framed glass doors.

F. Include plans, elevations, sections, and details.

1. Detail attachments to other work, and between units, if any.
2. Include hardware and required clearances.

G. Samples: For each exposed product and for each color specified, 12-inch-long (300-mm-long) section with weather stripping, glazing bead, and factory-applied color finish.

H. Samples for Initial Selection: For each type of folding aluminum-framed glass door indicated.

I. Include Samples of hardware and accessories involving color selection.

J. Samples for Verification: For folding aluminum-framed glass doors and components required, prepared on Samples of size indicated below:

K. Main Framing Member: 12-inch-long (300-mm-long) section with weather stripping, glazing bead, and factory-applied color finish.

1. Hardware: Full-size units with factory-applied finish.

1.6 INFORMATIONAL SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

B. Preparation instructions and recommendations.

C. Storage and handling requirements and recommendations.

D. Installation methods.

E. Shop Drawings: Include outside net frame dimensioning, direction of sliding track viewing rom the exterior, number of panels, identify configuration (primary handle with handle set, fixed panel), typical head, side jamb, sill and panel details and type of glazing material per vertical plan and elevations view drawings.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. Manufacturer's Certificates: Certify products meet or exceed specified requirements.Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article. Retain "testing agency" option if Contractor is providing testing in "Field Quality Control" Article.

I. Qualification Data: For **Installer**.

J. Product Test Reports: For each folding aluminum-framed glass door, for tests performed by **a qualified testing agency**, and for each class and performance grade indicated, tested at AAMA gateway size.

K. Field quality-control reports.

L. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes, weather stripping, operable panels, and operating hardware to include in maintenance manuals and periodic cleaning and maintenance of all railing and infill components.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating folding aluminum-framed glass doors that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

B. Installer Qualifications: An installer acceptable to folding aluminum-framed glass door manufacturer for installation of units required for this Project.

1. Installer to provide reference list of at least three (3) projects of similar scale and complexity successfully completed in the last three (3) years.

2. Installer to be trained and certified by manufacturer

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's instructions and recommendations, Section 01 60 00 requirements, and as follows:

1. Deliver materials to job site in sealed, unopened cartons or crates.

a. Upon receipt, contractor to inspect the shipment to ensure it is complete, in good condition and meets project requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Contractor to store material under cover in a clean and dry location, protecting units against weather and defacement or damage from construction activities, especially to the edges of panels.

1.10 FIELD CONDITIONS BY CONTRACTOR

A. Field Measurements: Contractor to field verify dimensions of rough openings (R.O.) [and threshold depressions to receive sill.] Mark field measurements on product drawing submittal.

1.11 WARRANTY

A. Manufacturer Warranty: Provide Folding Glass Storefront system manufacturer's standard limited warranty as per manufacturer's published warranty document in force at time of purchase, subject to change, against defects in materials and workmanship.

1. Warranty Period beginning with the earliest of 120 days from Date of Delivery or Date of Substantial Completion:

a. Rollers and Insulated Glass Seal Failure: Ten (10) years
b. All Other Components Except Screens: Ten (10) years

1) Exception: Five (5) years if NOT installed by manufacturer's specific system approved or certified trained installer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following

1. Basis-of-Design Product by Manufacturer: NanaWall SL60 by NANA WALL SYSTEMS, INC. (www.nanawall.com)

2. Or Approved Equal

2.2 PERFORMANCE REQUIREMENTS

A. Performance Criteria (Lab Tested): (Low Profile Saddle Sill - Inward/Outward Opening)

1. Air Infiltration| Exfiltration (ASTM E283):

a. 0.10| 0.08 cfm/ft2 (0.5| 0.4 L/s/m2) at a static air pressure difference: of 1.57 psf (75 Pa)
b. 0.37| 0.17 cfm/ft2 (1.9| 0.9 L/s/m2) at 6.24 psf (300 Pa)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Water Penetration (ASTM E331, ASTM E547): No uncontrolled water leakage at a static test pressure of 5.43 psf (260 Pa) with weeps by others

3. Structural Loading (ASTM E330): [DP-40] [DP-45

   a. Design Pressure – Positive Inswing or Negative Outswing: 40 psf (1920 Pa)
   b. Design Pressure – Negative Inswing or Positive Outswing: 45 psf (2160 Pa)

4. Swing Panel with Surface Mounted Hinges - Operation / Cycling Performance (AAMA 920): 500,000 cycles

5. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

6. Glass Acoustical Performance (DIN 52210-3,4): With 38 Db glass, unit Rw (STC) of 36

7. System - Life Cycle Performance (DIN EN 1191/12400): Pass; 20,000 cycles

8. Forced Entry (AAMA 1304): Meets requirements

9. Thermal Performance (U-factor): NFRC 100 maximum total fenestration product U-factor of ≤ 0.30 Btu/sq. ft. x h x deg F (1.83 W/sq. m x K).

10. Solar Heat Gain Coefficient (SHGC): NFRC 200 maximum total fenestration product SHGC of 0.40.

11. Air Leakage: NFRC 400 rated, certified, and labeled meeting ≤ 0.5 cfm/ft2 (2.56 L/s/m2)

12. Condensation Resistance Factor (CRF): NFRC 500 rated, certified, and labeled showing a CRF of 45

13. EPA Energy Star: Meets requirements

B. LEED Characteristics:

1. LEED v4 for Building Design and Construction (BD&C)

   a. EAc2: Manufacturer systems using low U-Value designed double or triple IGU and thermally broken frames can provide significant energy performance.
   b. MRc1: Manufacturer can be easily disassembled for salvage and reuse.
   c. EQc7: Manufacturer glass wall assembly borrowed light brings daylight deeper into the floor plate.
   d. EQc8: Manufacturer glass wall assemblies provide direct outdoor lines of sight.

2.3 FOLDING ALUMINUM-FRAMED GLASS DOORS

A. Sizes and Configurations: As indicated by the Drawings for selected number and size of panels, location of swing panels, and location of tracks and stacking bays.

B. Unit Operation: Sliding and folding hardware with top and bottom tracks;

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Mounting Type: Floor track supported

C. Panel Configuration: Straight]

D. Panel Type: Hinged

E. Primary swing panel of paired swing panels, looking from inside, to be on left.

F. Entry/Egress panel hinged to side jamb.

G. Panel Pairing Configuration: See Drawings.

H. Stack Storage Configuration: outswing

2.4 MATERIALS

A. Thermally Broken Aluminum Framed Folding Glass Storefront Description: Top-hung or floor track supported system. Manufacturer's standard frame and panel profiles, with head track, side jambs and panels with dimensions as shown on Drawings.

1. Panels and Frames
   a. Panels
      1) Single lite.
         a) Panel Size (W x H): As indicated.
         b) Rail Depth: 2-5/16 inch (59 mm)
         c) Top Rail and Stile Width: 2-3/8 inch (60 mm)
         d) Bottom Rail Width: 2-3/8 inch (60 mm)
      2) Manufacturer's standard kickplate: 10"
   b. Frame:
      1) Matching top track and side jambs
         a) Top Track Width (Top-Hung): 3-15/16 inch (100 mm)
         b) Top Track Width (Floor Supported) 2-9/16 inch (65 mm)
         c) Side Jambs Width: 2-9/16 inch (65 mm)
         d) Top Track and Side Jambs Depth: 3-1/8 inch (66 mm)
   c. Sill Type:
      1) Low profile saddle sill (thermally broken)
      2) Sill Aluminum Finish:
         a) a dark bronze anodized finish
      3) For ADA Compliance at Swing Panel: Provide gasket to cover the channel in the sill at swing panels.

2. Aluminum Extrusion: AlMgSi0.5 alloy, 6063-T5 (F-22 - European standard)
   a. Thickness: 0.078 inch (2.0 mm) nominal
   b. Thermal Break: 7/8 inch (22 mm) wide polyamide plastic reinforced with glass fibers. Narrower or poured and de-bridged type thermal breaks not acceptable.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Panel and Frame Aluminum Finish: Inside and Outside;
    a. Same (one-color)
    b. Powder Coat (AAMA 2604):
        1) Color as chosen from manufacturer's powder coating finish chart from manufacturer's full RAL selection.
            a) Matte

B. Glass and Glazing: Per Section 08 80 00 “Glazing”

1. Triple Glazed (1 3/8-inch (35 mm) nominal thickness

2. Safety Glazing: In compliance with ASTM C1036, ASTM C1048, ANSI Z97.1 and CPSC 16CFR 1201.

C. Locking Hardware and Handles:

1. Main Entry Panels for Models WITH Single Swing Panel attached to the Side Jamb and with Surface Mounted Hinges.

2. Main Entry Panel: Provide manufacturer’s flat handles with return on the inside and outside, and a lockset with a lockable latch, and multi-point locking with a dead bolt and rods at the top and bottom on primary panel only.
    a. Rods to be concealed and not edge mounted.
    b. After turn of key or thumb-turn, depression of handles withdraws latch.
    c. Lifting of handles engages rods and turn of key or thumb turn engages deadbolt and operates lock.

3. Secondary Swing Panel: No hardware or locking provided by manufacturer; Field installed electronic panic device by Section 08 71 00 with lever handle on outside

4. Flat Handle - Finish: Brushed satin stainless steel

5. Locking: Adapter for Small Format Interchangeable Core (SFIC) by others

6. Handle Height: 41-3/8 inch (105 cm) centered from bottom of panel or as otherwise indicated.

7. Aluminum locking rods with standard fiberglass reinforced polyamide end caps at the top and bottom. Rods to have a stroke of 15/16 inch (24 mm).

8. Additional profile cylinders to be keyed alike..]

D. Sliding- Folding Hardware: Provide manufacturer’s standard combination sliding and folding hardware with top and bottom tracks and threshold. All running carriages to be with sealed, self-lubrication, ball bearing multi- rollers. Surface mounted hinges and running carriages not acceptable.

1. For Each Pair of Folding Panels:
    a. Floor Supported System (SL60/u): Provide upper guide carriage and lower running carriage with two vertical stainless-steel wheels and two horizontal

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

wheels. Vertical wheels to ride on stainless steel guide track covers over the full length of sill track and lie above the water run-off level.

1) Lower Running Carriage Carrying Capacity: 220 lbs. (100 kg)

2. On All Four Corners of Panels: Provide thermally broken die cast zinc multi-functional corner fittings with carriage connectors, hinges and standard hinge pins.

a. Finish: Powder coated, closest match to finish of frame and panel.

3. Adjustment: Provide 1/16 inch (1.5 mm) in width per hinge adjustments without removing panels from tracks and without needing to remove panels from tracks.

E. Weather stripping: Manufacturer's double layer EPDM between panels, EPDM gasket and Q-lon gasket, or brush seal between panel and frame, or brush seals with a two-layer fiberglass reinforced polyamide fin attached at both inner and outer edge of bottom of door panels with a recessed sill or on frame for sealing between panels and between panel and frame.

F. Fasteners: Tapered pins and stainless-steel screws for connecting frame components.

2.5 FABRICATION

A. Fabricate folding aluminum-framed glass doors in sizes indicated. Include a complete system for assembling components and anchoring doors.

B. Folding Glass Wall: Extruded aluminum frame and panel profiles, corner connectors and hinges, sliding and folding hardware, locking hardware and handles, glass and glazing and weather-stripping components needed to construct a folding glass wall.

1. Each unit factory pre-assembled and shipped with complete system components and installation instructions.

2. Exposed work to be carefully matched to produce continuity of line and design with all joints.

3. No raw edges visible at joints Fabricate folding aluminum-framed glass doors that are reglazable without dismantling panel framing.

C. Weather Stripping: Provide full-perimeter weather stripping for each door panel.

D. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.

E. Factory-Glazed Fabrication: Glaze folding aluminum-framed glass doors in the factory where practical and possible for applications indicated. Comply with requirements in Section 08 8000 "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440.

F. Sizes and Configurations: Fabricate to sizes and configurations indicated on the Drawings. Verify opening sizes by field measurement prior to completing fabrication.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

G. Verify sliding direction for opening units.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination and Acceptance of Conditions per Section 01 70 00 and as follows:

1. Carefully examine rough openings with Installer present, for compliance with requirements affecting Work performance.
    a. Examine surfaces of openings and verify dimensions; verify rough openings are level, plumb, and square with no unevenness, bowing, or bumps on the floor; and other conditions as required by the manufacturer for readiness to receive Work.
    b. Verify structural integrity of the header for deflection with live and dead loads limited to the lesser of L/720 of the span or 1/4 inch (6 mm). Provide structural support for lateral loads, and both wind load and eccentric load when the panels are stacked open.
2. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight folding aluminum-framed glass door installation.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install Folding Glass Storefront system in accordance with the Drawings, approved submittals, manufacturer's recommendations and installation instructions, and as follows:

1. Properly flash, waterproof and seal around opening perimeter.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Securely attach anchorage devices to rigidly fit frame in place, level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work

3. When lower track is designed to drain, provide connections to allow for drainage.

4. Install panels, handles, lockset, screens and other accessories in accordance with manufacturer's recommendations and instructions.

5. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections per Section 01 40 00 of the following:

1. Verify the Folding Glass Storefront system operates and functions properly. Adjust hardware for proper operation.

B. Non-Conforming Work: Repair or replace non-conforming work as directed by the Architect; see General and Supplementary Conditions, and Division 01, General Requirements.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Lubricate hardware and moving parts.

B. Adjust operating panels and screens to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and a weathertight closure. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.

C. Clean exposed surfaces immediately after installing folding aluminum-framed glass doors. Avoid damaging protective coatings and finishes. Remove nonpermanent labels, excess sealants, glazing materials, dirt, and other substances.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect folding aluminum-framed glass door surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances contact folding aluminum-framed glass door surfaces, remove contaminants immediately according to manufacturer's written instructions.

F. Refinish or replace folding aluminum-framed glass doors with damaged finishes.

G. Replace damaged components.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes:

1. Four-fold metal doors with surface mounted tube frames.
2. Operation of four-fold metal doors includes overhead mounted electro-mechanical operators.
3. Related accessories to provide a complete and operational quick-response door system.

B. Related Requirements:

1. Section 01 81 13, “Sustainable Design Requirements”, for applicable requirements.
2. Section 05 50 00, “Metal Fabrications”, for floor-mounted pedestals supporting door controls.
3. Section 08 36 13, “Sectional Overhead Doors”, for coordination with door controls.
4. Division 26, Electrical, for power supplied to door motors

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 SUBMITTALS

A. Product Data for each type of product specified consisting of manufacturer’s technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.

B. Submittal Drawings showing fabrication and installation of four-fold metal doors including plans, elevations, sections, details of components, hardware, operating mechanism, and attachments to the other units of work. Include wiring diagrams for coordination with electrical trade.

C. Doors Installer: The installation of doors shall be a factory trained and certified door company of the door manufacturer or supervised by an authorized representative of the door manufacturer.

D. Performance Requirements:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. General Performance: Four-fold doors shall meet performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
2. Doors shall be designed to withstand external or internal horizontal wind loads of 20 pounds minimum per square foot. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 pounds per square inch. Steel frames shall be designed in accordance with the AISC Steel Construction Manual.
3. Structural Loads:
    a. Wind Loads: As indicated on Drawings.
        1) Basic Wind Speed: 115 mph.
        2) Exposure Category: B.
    b. Seismic Loads: As indicated on Drawings.
4. Operation-Cycle Requirements: Provide four-fold door components and operators capable of operating for not less than 1 million cycles.

PART 2 - PRODUCTS

2.1 MANUFACTURER AND MODEL

A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Four-Fold, FF300 Series, glazed industrial metal doors manufactured by Door Engineering and Manufacturing, 400 Cherry Street, Kasota, MN 56050, (800) 959-1352, http://www.doorengineering.com.
2. Or equal.

B. Manufacturer to have stock of all components readily available.

C. Manufacturer to have installed over 40 doors in the last 8 years in the Pacific Northwest.

2.2 GENERAL

A. Or equal products shall meet the salient characteristics identified herein for that product.

2.3 MATERIALS

A. Structural Steel: ASTM A513 and ASTM A500/A500M.

B. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1011/A1011M hot-rolled steel sheet.

C. Hardware: Manufacturer's standard components.

D. Fasteners: Zinc-coated steel.

E. Glass: Refer to Section 08 80 00, Glazing.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.4 FOUR-FOLD DOORS

A. Construction: Door framing shall be 14-gauge structural steel tube with 14-gauge steel sheet on the exterior and interior faces. Doors shall be 2-inch thick. Sheeting shall be formed on the vertical edges with no visible welds on the interior or exterior panel faces. All frames and framing members shall be true to dimension and square in all directions, and no door shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Exposed welds and welds which interfere with the installation of various parts shall be ground smooth and flush. Hinges to be cast stainless steel. Each door shall be equipped with a pull handle for manual operation.

B. Surface Mounted Tube Frame: Supply prehung steel tube frame system, designed to anchor to wall construction. All hinges, track supports and operator supports shall be factory attached.

C. Door Finish: Door Panels and Tube Frames shall be finished with factory applied manufacturer's standard PPG Spectracron epoxy primer and polyurethane top coat.

1. Color: as selected by architect from Manufacturer's standard color chart or match architect's sample.
2. Operator and operating hardware shall be powder-coated manufacturer's standard gray.

D. Operating Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation.

1. All hardware, including hinges and trolleys, shall be bolted to the panel for easy removal for service or panel replacement.
2. Top tracks shall be adjustable on the end track hangers to allow for adjustment of the door panels in the open position and easily replaceable without removal of the door framing or operators.

E. Hinges: Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Jamb hinges shall be gusseted. Fold hinges shall be dual shear with two thrust bearings. All bearings shall be completely concealed within the hinge barrel. All hinge pins shall be minimum 3/4-inch diameter hardened steel.

1. Hinge Guards: Provide plastic guards at jamb hinges to prevent access through hinge space.

F. Door Insulation: Polyisocyanurate foam insulation in panels and tube frames.

G. Weatherstripping: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weatherstripping at center shall be 1/16" cloth inserted neoprene and include no exposed fasteners on the exterior face of the panel. Weatherstripping at sill shall include two 1/16" cloth inserted neoprene sweeps with an aluminum retainer. The retainer shall be attached to the door with adhesive.

H. Perimeter Weatherstripping: Provide jamb and head weatherstipping of 1/16-inch cloth-inserted neoprene bulb (or closed cell neoprene).

I. Vision Panels: Doors shall be glazed with 1-inch tempered and insulated exterior low-e glass units, of the size, shape and location as noted on Drawings.

1. Glass – Insulated Units: See Section 08 80 00, Glazing, for glass unit type and requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.5 OPERATOR

A. Each four-fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation. Operator consists of an electric motor, gear reducer, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door section and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be equipped with oil impregnated bronze bearings on polished shafts.

B. Operator shall be instantly reversible, open and close rapidly and start and stop gradually. Operator shall be adjustable to allow door to fully clear the opening. Operator shall automatically lock the door in the closed position. Operator shall be equipped with disengaging mechanism to convert to free wheeling mode for manual operation.

C. Doors and Controls Electrical Power: Doors and control electrical power shall be connected to emergency power circuits.

D. Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. The motor shall be wound for three-phase 208V ac, 60-Hz operation.

E. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, and built in accordance with the latest NEMA standards. Incoming electrical shall be: 208/230VAC 3-phase.

1. Control panel assemblies shall be UL listed as per NFPA70
2. Controls shall include a programmable logic controller with digital message display. Controller shall include programmable close timers and programmable inputs/outputs.
3. Controls shall include a variable frequency drive with independent adjustment of the opening and closing speeds
4. Motor starters shall be magnetic reversing, factory wired with overload and under voltage protection, and equipped with mechanical interlocks. All control components shall be enclosed in one enclosure with a wiring diagram placed on the inside of the cover.
5. Enclosures shall be NEMA 4 with disconnect switch.
6. Pushbuttons (interior) for each door shall have one momentary pressure three-button pushbutton station marked OPEN, CLOSE and STOP. Pushbutton enclosure shall be NEMA 4.
7. A second pushbutton station for each door shall be provided at a master control location as indicated on Drawings.
8. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position.
9. Safety Edges: Provide electric safety edges on leading edge of all doors to reverse door upon contact with obstruction. Provide wireless safety edge transmitters with low battery alarm.
10. Photo Eyes: Provide (1) exterior, jamb mounted, light Curtain type photo eyes, NEMA 4 rated. Photo eye shall cover from floor level to 72" above floor.
11. Presence Sensor: Provide (1) interior, overhead mounted, presence sensor with pre-open and pre-close safety fields. Sensor shall be LZR-Widescan or equal
12. Radio Controls:
    a. Provide one radio receiver and one, two-button (open/close) remote for each door. Coordinate type and programming with owner's designated

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

representative, for compatibility with other door and gate operators, and radio systems.

b. Provide remotes to owner for installation in vehicles.

c. Supply and install a remote antenna and mounting kit; locate as shown on Drawings or directed by architect.

13. Loop Detectors: Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared. Include hand/auto switch to deactivate timer. Contractor to coordinate installation of preformed loop with installer prior to exterior apron being poured.

14. Wiring: Door manufacturer shall supply controls only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring. All control wiring shall be brought to the point of connection by the electrical contractor. Connections to the control devices shall be by the door installer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install four-fold metal doors in strict accordance with the approved drawings by qualified door erection crews. All door openings shall be completely prepared by the Contractor prior to the installation of the doors. Permanent or temporary electric wiring shall be brought to the door opening before installation is started and shall be completed so as not to delay the inspection test.

B. Doors shall be set plumb, level, and square, and with all parts properly fastened and mounted. All moving parts shall be tested and adjusted and left in good operating condition.

3.2 ADJUSTING AND CLEANING

A. Upon completion of installation including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

B. Inspection of the doors and a complete operating test will be made by the installer in the presence of the Contractor and Architect as soon as the erection is complete. Any defects noted shall be corrected. After door approval in the above test, the Contractor must assume the responsibility for any damage or rough handling of the doors during construction until the building is turned over to the Government and final inspection is made.

C. Clean surfaces and repaint abraded or damaged finished surfaces to match factory-applied finish.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of overhead doors:

1. Steel Sectional Overhead Door with aluminum framed vision panels
2. Fully Glazed Aluminum Sectional Overhead Door
3. Emergency Radio control Auxiliary Click2enter electromechanical door controller

B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submittal requirements.
2. Division 01 Section "Sustainable Design Requirements" for applicable Sustainability requirements.
3. Division 05 Section "Metal Fabrications" for metal jambs
4. Division 06 Section "Rough Carpentry" for blocking at bracing and supports
5. Division 07 Section "Joint Sealants" for perimeter sealants and back-up material
6. Division 08 Section "Glazing" for glazing requirements at Sectional Overhead Doors.
7. Division 09 Section "Painting" for field-applied paint finish.
8. Division 26 Sections for electrical service and connections for powered operators and accessories.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Operation Cycle: One cycle of a door is complete when it is moved from the closed position to the fully open position and returned to the closed position.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Sectional doors shall meet performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.

B. Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Wind Loads: As indicated on drawings
2. Seismic Loads: As indicated on drawings

C. Operation-Cycle Requirements: Provide sectional overhead door components and operators capable of operating for not less than 75,000 cycles.

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type and size of sectional overhead door and accessory. Include the following:

1. Details of construction relative to materials
2. Dimensions of individual components.
3. Profiles.
4. Finishes.
5. Performance values for each door type
6. Structural performance calculations

C. Provide roughing-in-diagram, operating instructions and maintenance information. Include the following:

1. Setting drawings, templates and installation instructions for built-in or embedded anchor devices.
2. Summary of forces and loads on walls and jambs.
3. Blocking requirements for track, springs and etc.
4. Push button locations heights and associated conduit requirements.
5. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding treatment lugs, conduit entry and grounding lug; and coatings.

D. Shop Drawings: Include detailed plans, elevations, details, details of framing members, required clearances, anchors and accessories. Include relationship with adjacent materials. Include specified components and installation not dimensioned or detailed in manufacturer's data sheets.

1. Wiring Diagrams: Detail wiring for power, signal and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by door manufacturer and those provided by others.
2. Plans specific to this project, indicating mounting and support details coordinated with mechanical, electrical, fire protection and plumbing equipment.
3. Blocking requirements for track, springs, etc.
4. Push button location, heights and associated conduit requirements.
5. Include details and attachments including identified supports needed by others if not provided.

E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. Sectional door panel: 6 inches (150 mm) square min.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Manufacturer's Certificates: Signed by manufacturers certifying that they comply with requirements specified in "Quality Assurance" article. On request, submit evidence of manufacturing experience.

G. Provide installer qualification certificates

H. Maintenance Data: To include in maintenance manuals.

I. Warranties: Sample of warranties specified in this section to be included in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

1. Provide installer qualification certificates and demonstrate installer has experience in the installation of overhead doors for fire stations. Include list of a minimum of 3 northwest area fire stations with contact information, which have a successful track record of installation from installer using manufactures product.

B. Source Limitations: Obtain sectional doors from single source from single manufacturer.

1. Obtain operators and controls from sectional door manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of sectional overhead doors and accessories and are based on the specific system indicated. Other manufacturers' systems with equal performance and dimensional characteristics may be considered. Refer to Division 1 Section "Product Requirements."

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.

E. Review and Acceptance: Overhead Door Submittals and Installation will be reviewed for compliance with the contract documents by an approved manufacturer's representative. The Contractor shall be required to correct defects and non-confirming work identified by the manufacturer's representative. Acceptance of the completed Overhead Door installation and operation by the Manufacturer will be a requirement for Final Completion of the Work

1.8 DELIVERY, STORAGE AND HANDLING

A. Store Products in manufacturer's unopened labeled packaging until ready for installation.

B. Protect materials from exposure to moisture until ready for installation

C. Store materials in a dry weather tight location.

PART 2 - PRODUCTS

2.1 STEEL SECTIONAL DOOR SECTIONS

A. Available Manufacturer: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Basis of Design: Overhead Door Corporation – Thermacore 592
2. Or approved equal.

B. Panel Thickness: 2-inches

C. Performance Values:

1. Thermal Conductance: Provide steel overhead doors with less than 50% glazing areas having an average Unit U-factor of not more than **0.34 Btu/sq. ft. x h x deg F** maximum when tested according to AAMA 1503.
2. Thermal Conductance: Provide steel overhead doors with 50% or more glazing areas having an average Unit U-factor of not more than **0.34 Btu/sq. ft. x h x deg F** maximum when tested according to AAMA 1503.
3. Solar Heat Gain Coefficient (SHGC) at steel overhead doors with less than 50% Glazing Area: Average Unit SHGC of not more than **0.40** maximum**.**
4. Solar Heat Gain Coefficient (SHGC) at steel overhead doors with 50% or more Glazing Area: Average Unit SHGC of not more than **0.40** maximum.
5. Air Infiltration: <0.4 cfm at 15 mph.
6. Wind Load Design: ANSI/ DASMA 102 standards as required by code.

D. Construct door sections from galvanized, structural-quality carbon-steel sheets complying with ASTM A 653 (ASTM A 653M), commercial quality, with a minimum yield strength of 33,000 psi (225 MPa) and a minimum G40 (Z120) zinc coating.

1. Steel Sheet Thickness: 28 gauge (.024 inch)
2. Exterior Section Face: Grooved, ribbed or fluted, smooth.

E. Fabricate door panels from a single sheet to provide sections not more than 24 inches (600 mm) high and nominally 2 inches (50 mm) deep. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.

1. Provide door sections with continuous thermal-break construction, separating faces of door.

F. Enclose open section with not less than 0.064-inch (1.6-mm) galvanized steel channel end stiles welded in place. Provide not less than 0.064-inch (1.6-mm) galvanized intermediate stiles, cut to door section profile, spaced at not more than 48 inches (1200 mm) o.c., and welded in place.

G. Reinforce bottom section with a continuous channel or angle complying with bottom section profile and allowing installation of astragal.

H. Reinforce sections with continuous horizontal reinforcement, as required to stiffen door and for wind loading. Provide galvanized steel bars, struts, trusses or strip steel, formed to depth and bolted or welded in place. Coordinate exact locations and requirements with architect prior to installation.

1. Do **not** install reinforcing across vision panels.
2. Provide reinforcement for hardware attachment.

I. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free and HCFC-free polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

within steel sections that incorporate the following interior facing material, with no exposed insulation:

1. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated thickness.

J. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints, and free of warp, twist and deformation.

K. Glazed Panels: Full view, aluminum-framed section with glazing sealed with glazing tape and aluminum glazing bead.

1. Aluminum frame and glazing bead to be dark bronze or match door panel color as selected by architect.
2. Glazing: Comply with requirements in Division 08 Section "Glazing."

L. Track Type: Standard Lift.

M. Finish galvanized steel door sections as follows:

1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
2. Surface Preparation: Clean galvanized surfaces with non-petroleum solvent so surfaces are free of oil and surface contaminants.
3. Pretreat zinc-coated steel, after cleaning, with a conversion coating of type suited to organic coating applied over it.
4. Apply manufacturer's standard primer to both door faces after forming, according to coating manufacturer's written instructions for application and minimum dry film thickness.
5. Apply manufacturer's standard primer and baked on polyester coats to interior and exterior door faces after forming, according to coating manufacturer's written instructions for application, thermosetting and minimum dry film thickness.
6. Exterior door face to be field painted per 09 9100 prior to installation.
   a. Color and Gloss: Match Architect's sample.

2.2 GLAZED ALUMINUM SECTIONAL DOOR SECTIONS

A. Available Manufacturer: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Fully Glazed Aluminum Sectional Overhead Door; Basis-of-Design Product: Overhead Door Corporation– 521
2. Or approved equal.

B. Construct door sections with extruded-aluminum shapes, complying with ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated. Basis of design wall thickness not less than 0.065 inch (1.6 mm) for door section 2 inches deep. Fabricate sections with stile and rail dimensions and profiles shown. Join stiles and rails by welding or with concealed, 1/4-inch- (6-mm-) minimum diameter, aluminum or nonmagnetic stainless-steel through bolts, full height of door section. Form meeting rails to provide a weathertight-seal joint.

1. Center Stile Width: 2-1/2-inches
2. End Stile Width: 5-1/2-inches

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Intermediate Rail Pair Width: 3-1/2-inches
4. Top Rail: 5 1/2-inches
5. Bottom Rail: 5-1/2-inches

C. Section Reinforcing: Continuous horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Ensure that reinforcement **does not** obstruct vision lites.

1. Provide reinforcement for hardware attachment

D. Insulated Stiles and Rails: Fill stiles and rails manufacturer's standard polyurethane expanding foam to meet performance U-values listed in this section.

E. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints, and free of warp, twist and deformation.

F. Glazed Panels: Full view, aluminum-framed section with glazing sealed with glazing tape and aluminum glazing bead.

1. Aluminum frame and glazing bead to be dark bronze or match door panel color as selected by architect.
2. Glazing: Comply with requirements in Division 08 Section "Glazing."

G. Performance Values:

1. Thermal Values: Overall U-Value: .4
2. Air Infiltration: <0.4 cfm at 15 mph
3. Wind Load Design: ANSI/ DASMA 102 standards as required by code.

H. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

1. Aluminum Finish: Comply with **AAMA 2604** requirements 1.2-mil (0.03-mm) dry film thickness for pigmented organic coatings applied to aluminum extrusions and panels.
2. Color and Gloss: **As selected by Architect from manufacturer's full range**.

I. Track Type: Lift Clearance.

2.3 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Provide manufacturer's 3-inch reverse angle, galvanized-steel system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances shown on Drawings, and complying with ASTM A 653/A 653M for minimum G60 (Z180) zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slope tracks at proper angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed. Weld or Bolt to track supports.

B. Track Reinforcement and Supports: Galvanized-steel track reinforcement and support members, complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors. Use of center support on track back-hang is required.

C. Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall. Support horizontal (ceiling) tracks with continuous angle welded to track

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

and supported by laterally braced attachments to overhead structural members at curve and end of tracks. Stability and location of support is responsibility of the door hanger. The contractor will coordinate all required backing and blocking during framing.

D. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door.

1. Color as selected by Architect from manufacturer's full range of colors.
2. Provide motor-operated doors with combination bottom, EPDM bulb type weatherseal and sensor edge.
3. In addition, provide continuous flexible seals at door jambs and head for a weathertight installation. Provide color as selected by architect.

E. Windows: Glazing per section 08 8000. Set glazing in vinyl, rubber, or neoprene glazing channel, as required. Provide frame and removable stops of same material and finish as door-section frames.

2.4 HARDWARE

A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch- (2.01-mm-) nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges where required, for doors over 16 feet (4.88 m) wide unless otherwise recommended by door manufacturer.

C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch- (76-mm-) diameter roller tires with 3-inch- (76-mm-) wide track.

2.5 COUNTERBALANCE MECHANISM

A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from oil-tempered-steel wire complying with ASTM A 229/A 229M, Class II, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least 5 to 1. Provide springs calibrated for a minimum of 100,000 cycles.

B. Cable Drums: Cast-aluminum or gray-iron casting cable drums grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide one additional midpoint bracket for shafts up to 16 feet (4.87 m) long and two additional brackets at one-third points to support shafts more than 16 feet (4.87 m) long unless closer spacing is recommended by door manufacturer.

C. Cable Safety Device: Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either cable breaks.

D. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level shaft and prevent sag.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.6 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assemblywith 1-hp electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, and specified control devices, integral gearing for locking door, and accessories required for proper operation. Verify capacity recommend by manufacturer prior to installation

B. Comply with NFPA 70

C. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70, Class 2 control circuit, maximum 24-V, AC or DC.

D. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

E. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf (111 N).

F. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.

G. Product:

1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.

2. (Steel Sectional Door) Trolley or drawbar type, with V-belt primary drive, chain-and-sprocket secondary drive, and quick release for manual operation.

    a. Basis of Design: Liftmaster Elite Series Logic 4.0 Model T Industrial-Duty Trolley Operator. Provide all operations and control accessories as required for operation requirements specified
    b. Electrical Characteristics: 1-phase 120V, 60Hz.

3. (Glazed Aluminum Sectional Door) Jackshaft gear-head type, with enclosed worm-gear, running-in-oil, primary drive; chain-and-sprocket secondary drive; and quick release for manual operation.

    a. Basis of Design: Liftmaster Elite Series Logic 4.0 Model J Industrial-Duty Jackshaft Operator. Provide all operations and control accessories as required for operation requirements specified
    b. Operator Type: Jackshaft, side mounted.
    c. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet (2.4 m) or lower.
    d. Motor Exposure: Interior, clean, and dry.
    e. Electrical Characteristics: 1-phase 120V, 60Hz

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

H. Coordinate wiring requirements and current characteristics of motors with building electrical system. Provide all power and control wiring from point of connection

I. Provide additional control to enable automatic door actuator to close door 4 minutes after being fully opened (Verify closing time with owner and adjust as needed)

J. Recessed remote Control Station: Provide momentary-contract, recessed (flush mount) NEMA 1 three-phase control station with push button controls labeled "Open", "Close" "Stop" and control wiring at each door and where shown on electrical drawings. LCE-3, MMTC, INC.

K. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

1. Photoelectric Sensor (monitored): Manufacturer's heavy duty commercial photo eye system designed to detect an obstruction in door opening without contact between door and obstruction. Provide (2-sets at each door)

   a. Mount one set of photo sensors at 34-inches above finish floor and one set (monitored) at 6-inches above finish floor with adjustable brackets for alignment

   b. NEMA 4X protection class enclosure
   c. Infrared transmitter and receiver sensors.

2. Pressure-Sensor Edge (unmonitored): Provide each motorized door with an automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel.

   a. Connect to control circuit using take-up reel cable.
   b. Pneumatic actuated automatic bottom bar.

L. Provide auxiliary open and auxiliary closed limit switches wired to terminals.

M. Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

N. Radio Control: Provide Radio control system consisting of the following:

1. Three-channel, universal coaxial receiver to open, close, and stop door; two per operator.

2. Multifunction remote control.

3. Remote antenna mounting kit. Coordinate location with architect prior to installation.

O. Emergency Radio control: Auxiliary Click2enter electromechanical door controller

1. Auxiliary click2enter scanner receiver preemptive operator control by click2enter, inc. with regulated 12-24 V DC @ 500 mA transformer
2. Provide an isolation relay kit for each door the C2E will be controlling. The C2E part number for the isolation relay is as follows: Step-up Power Relay Part Number SPTD12VDC; 12V DC 40 Amp power relay SPDT with wired socket.
3. Location: as designated by architect

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction including all required blocking and other conditions affecting performance of the Work.

B. Verify locations and characteristics of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports according to approved Shop Drawings, manufacturer's written instructions, and as specified. Contractor to verify height of door operator with the Owner prior to installation.

1. Door installer shall be responsible for the complete system for smooth operation of the doors. Due to the standard frame spacing, additional support framing may be required. It is the responsibility of the door installer to verify and provide adequate support for the doors including additional support framing coordinated between the framing contractor, door manufacture and all other trades including but not limited to electrical lighting, mechanical venting and heating, and building insulation systems.

B. Fasten vertical track assembly to framing, spaced not less than 24 inches (600 mm) apart. Hang horizontal track from structural overhead framing with angle or channel hangers fastened to framing by welding or bolting or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Power-Operated Doors: Install automatic overhead doors openers in accordance with UL 325.

1. Door manufacturer shall supply controls only.
2. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring. All control wiring shall be brought to the point of connection by the electrical contractor.
3. Connections to the control devices shall be by the door installer.

D. Locate remote antenna on exterior of building with mounting kit and weather head, to be tested and approved by Owner prior to final acceptance.

E. Emergency Radio Control: install click2enter system per manufacturer’s installation instructions.

3.3 STARTUP SERVICES

A. Engage a factory-authorized service representative to perform startup services.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Coordinated with the Overhead Door Service Company for final acceptance of the completed Overhead Door installation and operation.

3.4 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and with weathertight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional overhead doors. Refer to Division 1 Section "Contract Closeout" and "Operation and Maintenance".

B. Test transmission frequency of apparatus at substantial completion with owner to verify doors will not activate without a deliberate action.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. This Section includes Kawneer Thermally Broken Aluminum Entrances, glass and glazing, and door hardware and components
2. Brake Metal Trim

B. Related Sections:

1. Division 1 Section "Submittal Procedures" for submittal requirements.
2. Division 1 Section “Quality Requirements” for Owner’s Building Envelope Consultant.
3. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
4. Division 7 Section "Joint Sealants" for joint sealants installed as part of aluminum entrance and storefront systems
5. Division 7 Section “Fluid Applied Water Resistive Barriers” for flashing of openings.
6. Division 7 Section “Sheet Metal Flashing and Trim” for flashing of openings.
7. Division 8 Section “Fiberglass Windows and Storefront.”
8. Division 8 Section “Finish Hardware”
9. Division 8 Section "Glazing"

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed entrance doors shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

B. Structural Loads:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Wind Loads: As indicated on Drawings.
   a. Basic Wind Speed: 115 mph.
   b. Exposure Category: B.
2. Seismic Loads: As indicated on Drawings

C. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 1.57 psf (75 Pa) for pairs of doors. A single 3'0" x 7'0" (915 mm x 2134 mm) entrance door and frame shall not exceed 1.0 cfm/ft2. A pair of 6'0" x 7'0" (1830 mm x 2134 mm) entrance doors and frame shall not exceed 1.0 cfm per square foot:

D. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 for typical application or L/180 for Small-Missile and Large-Missile impact, of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

E. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

F. Forced Entry: Tested in accordance with AAMA 1304

G. Thermal Conductance: Provide aluminum-entrance with fixed glazing and framing areas having an average Unit U-factor of not more than **0.43 Btu/sq. ft. x h x deg F** maximum when tested according to AAMA 1503.

H. Solar Heat Gain Coefficient (SHGC) at Aluminum-entrance with Fixed Glazing and Framing Areas: Average Unit SHGC of not more than 0.40 maximum.

I. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
   1. Insulated Glass – 57frame and 71glass (low-e).

J. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested in accordance with ASTM E 90, the STC and OITC ratings shall not be less than:
   1. 32 (STC) and 28 (OITC)

K. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD.

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Product Test Reports: Project specific test reports based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum-framed entrance doors and frames. Test results based on use of downsized test units will not be accepted

D. Sustainable Design Submittal:

1. Recycled Content:

a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content with a sample document illustrating project specific information that will be provided after product shipment.
b. Once product has shipped, provide project specific recycled content information, including:

1) Indicate recycled content; indicate percentage of pre- and post-consumer recycled content per unit of product.
2) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
3) Indicate location recovery of recycled content.
4) Indicate location of manufacturing facility.

c. Environmental Product Declaration (EPD).

1) Include a Type III Product-Specific EPD.

2. Product Data for Credit EQ 4.1: For adhesives and sealants used inside of the weatherproofing system, including printed statement of VOC content.
3. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials

E. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

F. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

G. Samples for Verification: For aluminum-framed door and components required.

H. Maintenance Data: For aluminum entrance systems to include in maintenance manuals.

I. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A manufacturer capable of fabricating thermally broken aluminum-framed entrance doors and storefronts that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports and calculations.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Source Limitations: Obtain thermally broken aluminum-framed door through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed glass entrance doors and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

F. Source Limitations for Aluminum-Framed Systems (Frames and Doors): Obtain from single source from single manufacturer.

G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

H. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions. Verify established dimensions with Architect prior to fabrication.

1.9 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration caused by thermal movements.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
d. Adhesive or cohesive sealant failures.
e. Water leakage through fixed glazing and framing areas.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

f. Failure of operating components.

2. Warranty Period: Two years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

2. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Kawneer North America; an Alcoa company.
2. Pacific Aluminum.
3. EFCO Corporation.
4. Or Approved Equal

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum-framed door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and door leaf members.

1. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
c. Indicate location recovery of recycled content.
d. Indicate location of manufacturing facility.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum-framed door members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Slide-In-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

2.3 GENERAL

A. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system

C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 ENTRANCE DOOR SYSTEMS

A. Basis of Design Product: Kawneer North America; an Alcoa company; AA425 Entrance system.

B. Entrance Doors: Thermally Broken, glazed entrance doors for manual-swing operation.

1. Door Construction: 2 1/4-inch (50.8-mm) overall thickness

a. Major portions of the door members to be 0.125" (4) nominal in thickness and glazing molding to be 0.05" (1.3 mm) thick. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and welded or that incorporate concealed tie rods.

b. Thermal Construction: High-performance connector system separating aluminum members exposed to the exterior from members exposed to the interior
c. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
d. Provide adjustable glass jacks to help center the glass in the door opening.

2. Door Design: Wide stile;

a. 4 1/4-inch nominal width stile and top rail.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. 10-inch bottom rail

C. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.5 BRAKE METAL TRIM

A. Provide Aluminum Extrusions in the shape, thickness, and profiles as indicated on drawings

2.6 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware as specified in Division 8 Section “Finish Hardware” and as indicated in this section.

B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Weather-stripping:

1. The door weathering on a single acting door Compression Weather Stripping: Molded neoprene complying with ASTM D 2000 requirements.
2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).

D. Threshold: Extruded aluminum, thermally broken, with ribbed surface.

1. Color as selected by architect.

E. Butt Hinge: Per Section 08 71 00

F. Continuous Hinge: Per Section 08 71 00.

G. Push/Pull: Per Section 08 71 00.

H. Exit Device: Per Section 08 71 00.

I. Closer: Per Section 08 71 00.

J. Security Lock/Dead Lock: Per Section 08 71 00

K. Latch Handle: Per Section 08 71 00.

L. Cylinder(s)/Thumbturn: Per Section 08 71 00.

M. Electric Harness: Per Section 08 71 00

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

N. Weather Stripping: Manufacturer's standard replaceable weather-stripping as follows:

1. Compression Weather Stripping: Molded neoprene complying with ASTM D 2000 requirements or molded PVC complying with ASTM D 2287 requirements.
2. Sliding Weather Stripping: Wool, polypropylene or nylon woven pile with nylon-fabric or aluminum-strip backing complying with AAMA 701 requirements.
3. Door sweep: Manufacturer's Neoprene or Vinyl door sweep.

2.7 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.8 FABRICATION

A. Fabricate thermally broken aluminum-framed entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.

B. Fabricate thermally broken aluminum-framed doors that are reglazable without dismantling perimeter framing.

1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1" (24 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
3. Prepare components with internal reinforcement for door hardware.
4. Arrange fasteners and attachments to conceal from view.

C. Weather-stripping: Provide weather-stripping locked into extruded grooves in door panels or frames as indicated on manufactures drawings and details.

2.9 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: Dark Bronze (or as otherwise selected from Manufacturer's full range of Anodic Finishes).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

E. Install aluminum Brake Metal tube steel column filler plate and cover plates to be integral within frame design.

F. Install glazing as specified in Division 08 Section "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.3 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

B. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch, measured to the leading door edge.

C. Contractor Water Testing: Perform owner approved water spray test of storefront installation to demonstrate performance. Test each complete assembly condition.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensures entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Fiberglass-framed windows and related glazing.
2. Fiberglass framed entry and storefront systems

B. Related Sections

1. Division 01 Section "Sustainable Design Requirements" for applicable Sustainability requirements.
2. Section 01 40 00 "Quality Requirements" for Owner's Building Envelope Consultant
3. Section 07 27 26 – "Fluid Applied Water Resistive Barriers"
4. Section 07 62 00 – "Sheet Metal Flashing and Trim"
5. Section 07 92 00 – "Joint Sealants"
6. Section 08 41 13 – "Aluminum Framed Entrances and Storefronts" for aluminum framed entrance doors.
7. Section 08 80 00 – "Glazing"

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor's responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 REFERENCES

A. American Architectural Manufacturers Association (AAMA):

1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.
2. AAMA 623 - Voluntary Performance Requirements and Test Procedures for Organic Coatings on Fiber Reinforced Thermoset Profiles.

B. American Society for Testing and Materials (ASTM):

1. ASTM C 1036 - Flat Glass.
2. ASTM C 1048 - Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
3. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
4. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Window and Door Manufacturers Association (WDMA):

1. ANSI/AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 00, "Submittal Procedures" requirements

B. Product Data: For each type of product, submit manufacturer's product data and project specific product summary.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for fiberglass windows.
2. Performance requirement data for each type of fiberglass window including "whole unit" U-values, SHGC, Air and water infiltration rating and structural rating.

C. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

1. Deliver NFRC Label certificates to the building inspector at the construction site.

D. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational emergency egress clearances, and details of installation, including anchor, flashing, and sealant installation.

E. Samples for Initial Selection: For units with factory-applied color finishes provide color charts of standard and premium custom options.

1. Include similar Samples of hardware and accessories involving color selection.

F. Samples for Verification: For fiberglass windows and components required, prepared on Samples of size indicated below:

1. Exposed Finishes: 2 by 3 inches (50 by 75 mm).
2. Exposed Hardware: Full-size units.

G. Product Schedule: For fiberglass windows. Use same designations indicated on Drawings.

H. Qualification Data: For manufacturer and Installer.

I. Product Test Reports: For each type of fiberglass window, for tests performed by a qualified testing agency.

J. Provide data for maintenance and cleaning in accordance with instructions under General Conditions to be submitted with O&M manuals

K. Field quality-control reports.

L. Sample Warranties: For manufacturer's warranties.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.6 QUALITY ASSURANCE

A. Provide test reports from an AAMA accredited laboratory certifying the performance requirements as required in this specification. Valid test reports shall be no more than four years old

B. Manufacturer Qualifications: A manufacturer capable of fabricating fiberglass windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

1. Member of American Architectural Manufacturers Association (AAMA), and the National Fenestration Rating Council (NFRC)
2. Minimum of 5-years experience fabricating insulated glazing units

C. Installer Qualifications: An installer acceptable to fiberglass window manufacturer for installation of units required for this Project.

D. Pre-installation Conference: Conduct conference at Project site. Review methods and procedures related to fiberglass windows including, but not limited to, the following:

1. Review installation schedule.
2. Review finish requirements and selections.
3. Review, discuss and coordinate the interrelationship of fiberglass windows with other exterior wall components. Including provisions for rough framing, masonry, structural anchorage, flashing, weeping, sealants, and protection of finishes.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

E. Mockups:

1. Provide sample installation for field testing window performance requirements and to determine acceptability of window installation methods.
2. Approved mockup shall represent minimum quality required for the Work.
3. Approved mockup shall remain in place within the Work

1.7 STORAGE AND HANDLING

A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.

B. Storage:

1. Store materials in accordance with manufacturer's instructions.
2. Store materials off ground and under cover.
3. Protect materials from weather, direct sunlight, and construction activities.

C. Handling: Protect materials and finish during handling and installation to prevent damage

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace fiberglass windows that fail in materials or workmanship within specified warranty period.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Failures include, but are not limited to, the following:
    a. Failure to meet performance requirements.
    b. Structural failures including excessive deflection, water leakage, and air infiltration.
    c. Faulty operation of movable sash and hardware.
    d. Deterioration of materials and finishes beyond normal weathering.
    e. Failure of insulating glass.
2. Warranty Period:
    a. Fiberglass Window: 20 years from date of Substantial Completion.
    b. Insulated Glass Units: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Products By: Subject to compliance with requirements, provide fiberglass windows and Storefront Systems by Cascadia Windows and Doors – Langley, BC, Canada.
    1. Or Approved Equal

B. Source Limitations: Obtain fiberglass windows from single source from single manufacturer.

2.2 FIBERGLASS STOREFRONT SYSTEM

A. Basis of Design: Universal Series Windows and Doors, by Cascadia (Series 1 on drawings)
    1. Materials and Product Composition:
        a. All frame and sash profiles are made from Pultruded Fiberglass.
            1) Pultrusions shall be manufactured with clamp-action equipment. No surface texture from rollers is permitted.
            2) Glass content average for pultruded profiles: 55% or more.
        b. Fasteners shall be 300 series stainless steel, 400 series stainless steel, or Leland Industries DT2000 coated of sufficient size and quantity to perform their intended function.
            1) Fastener corrosion resistance shall be: 2000 hours minimum, when tested in accordance with ASTM B117.
        c. Glazing tape: black, closed cell copolymer, polyethylene foam coated with an aggressive acrylic adhesive. All upward facing exterior horizontal joints to have an additional cap bead of neutral cure silicone.
        d. Internal sealants for frame joints and continuous heel beads: 1199 DOW Corning neutral cure silicone sealant.

B. Basis of Design: 400 Series Windows and Doors, by Cascadia (Series 2 on drawings)
    1. Materials and Product Composition:
        a. All frame and sash profiles are made from Pultruded Fiberglass.
            1) Pultrusions shall be manufactured with clamp-action equipment. No surface texture from rollers is permitted.
            2) Glass content average for pultruded profiles: 55% or more.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Fasteners shall be 300 series stainless steel, 400 series stainless steel, or Leland Industries DT2000 coated of sufficient size and quantity to perform their intended function.

1) Fastener corrosion resistance shall be: 2000 hours minimum, when tested in accordance with ASTM B117.

c. Glazing tape: black, closed cell copolymer, polyethylene foam coated with an aggressive acrylic adhesive. All upward facing exterior horizontal joints to have an additional cap bead of neutral cure silicone.

d. Internal sealants for frame joints and continuous heel beads: 1199 DOW Corning neutral cure silicone sealant.

C. Insulated Glazing Units: Per Section 08 80 00 "Glazing" Double and Triple Glazed Insulated glazing unit certified by IGMA (double at Apparatus Bay openings).

1. Tempered safety glass where indicated on drawings

D. Finish on Storefront Framing

1. Hydro Tuff two-component waterborne polyurethane, meeting the requirements of AAMA-625.

a. Interior Frame Finish: Architect to choose from manufacturer's standard color range.

b. Exterior Frame Finish: Architect to choose from manufacturer's standard color range.

E. Glazing Stops:

1. Provide pultruded fiberglass or extruded aluminum glazing stops as required by IGU thickness.
2. Lock-in, screw-less type.
3. No PVC materials shall be used for glazing stop or related accessories.

2.3 FIBERGLASS TILT TURN AND FIXED WINDOWS

A. Basis of Design: Universal Series Windows, by Cascadia (Series 1 on drawings)

1. Materials and Product Composition:

a. All frame and sash profiles are made from Pultruded Fiberglass.

1) Pultrusions shall be manufactured with clamp-action equipment. No surface texture from rollers is permitted.

2) Glass content average for pultruded profiles: 55% or more.

b. Fasteners shall be 300 series stainless steel, 400 series stainless steel, or Leland Industries DT2000 coated of sufficient size and quantity to perform their intended function.

1) Fastener corrosion resistance shall be: 2000 hours minimum, when tested in accordance with ASTM B117.

c. Glazing tape: black, closed cell copolymer, polyethylene foam coated with an aggressive acrylic adhesive. All upward facing exterior horizontal joints to have an additional cap bead of neutral cure silicone.

d. Internal sealants for frame joints and continuous heel beads: 1199 DOW Corning neutral cure silicone sealant.

B. Basis of Design: 400 Series Windows, by Cascadia (Series 2 on drawings)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Materials and Product Composition:
   a. All frame and sash profiles are made from Pultruded Fiberglass.
      1) Pultrusions shall be manufactured with clamp-action equipment. No surface texture from rollers is permitted.
      2) Glass content average for pultruded profiles: 55% or more.
   b. Fasteners shall be 300 series stainless steel, 400 series stainless steel, or Leland Industries DT2000 coated of sufficient size and quantity to perform their intended function.
      1) Fastener corrosion resistance shall be: 2000 hours minimum, when tested in accordance with ASTM B117.
   c. Glazing tape: black, closed cell copolymer, polyethylene foam coated with an aggressive acrylic adhesive. All upward facing exterior horizontal joints to have an additional cap bead of neutral cure silicone.
   d. Internal sealants for frame joints and continuous heel beads: 1199 DOW Corning neutral cure silicone sealant.

C. Insulated Glazing Units: Per Section 08 80 00 "Glazing" triple glazed insulated glazing unit certified by IGMA.
   1. Tempered safety glass where indicated on drawings

D. Hardware
   1. All hardware to be supplied by a single manufacturer:
      a. Approved manufacturer: Roto Frank of America.
   2. Tilt & Turn and Hopper windows: RotoSil nano corrosion resistant finish, multi-point locking hardware.
   3. Hardware finish: Color to be selected from supplier's standard range

E. Finish on Window Framing
   1. Hydro Tuff two-component waterborne polyurethane, meeting the requirements of AAMA-625.
      a. Interior Frame Finish: Architect to choose from manufacturer's standard color range.
      b. Exterior Frame Finish: Architect to choose from manufacturer's standard color range.

F. Glazing Stops
   1. Provide pultruded fiberglass or extruded aluminum glazing stops as required by IGU thickness.
   2. Lock-in, screw-less type.
   3. No PVC materials shall be used for glazing stop or related accessories.

2.4 PERFORMANCE REQUIREMENTS:

A. Air Tightness:
   1. Laboratory Testing
      a. Air infiltration and exfiltration rates at a static air pressure differential of 1.6 psf (75 Pa) when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-11 and ASTM E283 to be not more than:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Fixed glazing assemblies: 0.00 cfm/ft² (0.00 L/s.m²).
c. Inward opening tilt & turn-type (dual action) windows: 0.00 cfm/ft² (0.00 L/s.m²).

B. Water Penetration Resistance:

1. Laboratory Testing

a. There shall be no water infiltration at an air pressure differential of 15 psf (720 Pa) when tested in accordance with AAMA 101 and ASTM E331.
b. Water penetration resistance test pressure for all vent types, including: Fixed windows, casement, awning, tilt & turn: 15 psf (720 Pa).

2. Field Testing:

a. Fiberglass Storefront system Windows shall have no water infiltration at a cyclic static air pressure difference at 15 psf (720 Pa) when tested in accordance with AAMA 101 and ASTM E1105.
b. Fiberglass Vent type Windows shall have no water infiltration at a cyclic static air pressure difference at 12 psf (575 Pa) when tested in accordance with AAMA 101 and ASTM E1105.

3. Structural Requirements:

a. Performance grade (PG) and class of Fiberglass Storefront System with doors and and operable vent type windows shall be CW-95 or higher.
b. Performance grade (PG) and class of Fiberglass Storefront System without doors and fixed type Windows shall be CW-45 or higher.
c. Wind Loads: As indicated on Drawings to determine the wind pressure for the design or mullions, reinforcing, and other spanning members.

1) Basic Wind Speed (3-sec Gust): 115 mph.
2) Exposure Category: B.

d. Seismic Loads: As indicated on Drawings
e. Design glazing and fiberglass framing, including any spanning window frame members and reinforcing where required, in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-11. There shall be no deflection in excess of L/175 of the span of any window framing member.
f. Allow for deflection of building structure. Ensure no structural loads are imposed on window assemblies. In lieu of other specific requirements the minimum requirements are as specified by the structural engineer.

4. Thermal Requirements

a. The Thermal Transmittance U-Value shall be certified in accordance with the National Fenestration Rating Council (NFRC).
b. Fiberglass Storefront

1) Overall U-values, utilizing double and triple glazed IG units:
a) Double Glazed Windows - 0.27 Btu/(h·sf·F°) / 1.53 (W/m2·K) - (at Apparatus Bays)
b) Triple Glazed Windows: 0.16 Btu/(h·sf·F°), 0.91 (W/m2·K) – (Typical)
c) Doors: 0.15 Btu/(h·sf·F°), 0.85 W/(m2·K)
2) Energy Star: Windows must be ENERGY STAR® certified. Window manufacturer must provide required documentation and labeling.

c. Fiberglass Fixed Window

1) Overall U-values, utilizing double and triple glazed IG units:
a) Double Glazed Windows - 0.24 Btu/(h·sf·F°) / 1.4 (W/m2·K)
b) Triple Glazed Windows: 0.14 Btu/(h·sf·F°), 0.85 (W/m2·K)

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2) Energy Star: Windows must be ENERGY STAR® certified. Window manufacturer must provide required documentation and labeling.

d. Fiberglass Dual Action Window

1) Overall U-values, utilizing triple glazed IG units:
a) Windows: 0.15 Btu/(h·sf·F°), 0.85 (W/m2·K) – (Typical)

2) Energy Star: Windows must be ENERGY STAR® certified. Window manufacturer must provide required documentation and labeling.

5. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of **0.27**.

2.5 INSECT SCREENS

A. Compliance: ASTM D 3656 and SMA 1201.

B. Screen Cloth: Half-size with black, vinyl-coated, 18/16 mesh, fiberglass screen cloth set in aluminum frame fitted to outside of window or fitted as required for window operation.

C. Complete with necessary hardware.

D. Screen Frame Finish: Hydrotuff paint, same as fiberglass finish.

1. Color: Match window exterior.

2.6 FABRICATION

A. Fabricate fiberglass windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze fiberglass windows in the factory.

C. Fabricate framing from pultrusions of size and shape shown on shop drawings.

D. All framing joints shall be accurately machined, assembled, and sealed to provide neat weather-tight connections.

E. Provide interior heel bead as required for rain screen system.

F. All glazing pockets shall be vented, pressure equalized and drained to the exterior. Weather strip each operable sash to provide weathertight installation.

G. Glazing: Fixed, Casement and Awning windows shall be glazed with 1-inch nominal, insulated glass units.

H. Special shapes: Provide special shapes as indicated on the drawings to match window sections and installation requirements

I. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

J. Finish: The exposed surfaces of the fiberglass members shall be clean and free from surface blemishes. The finish is to conform to meet AAMA 624-07

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's written instructions. For basis of design, see posted website video.
https://www.cascadiawindows.com/support/installation/sb_expander_articles/342

B. Install windows to be weather-tight.

C. Provide the required shims and blocking and fasten the frames to the opening.

D. Maintain alignment with adjacent work.

E. Secure assembly to framed openings, plumb and square, without distortion.

F. Integrate window system installation with exterior water-resistant barrier using liquid applied products as defined on the Drawings and in Division 07. Apply and integrate flashing/sealant with water-resistant barrier in accordance with window manufacturer's instructions. Mock-up shall demonstrate conformance with all flashing/sealant requirements.

G. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using insulating foam sealant.

H. Seal window to exterior wall cladding with sealant and related backing materials at perimeter of assembly.

I. All window openings must be covered and secure at the end of each workday.

J. Install window screens on all operable windows

3.3 DISPOSAL OF DEBRIS

A. Remove all garbage off site and legally dispose of debris generated from the installation of the windows.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.4 FIELD QUALITY CONTROL

A. Contractor Water Testing: Perform owner approved water spray test of mockup to demonstrate performance. Test each complete assembly condition.

B. Testing Agency: If further testing is required, Owner will engage a qualified testing agency to perform tests and inspections.

C. Testing Services: Testing and inspecting of installed windows shall take place as follows:

1. Water-Resistance Testing:

a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

1) Testing Extent: All windows will be tested to the extent that the owner is satisfied that the windows meet specified requirements of each type. Windows shall be tested after perimeter sealants have cured.
2) Test Reports: Prepared according to AAMA 502.

D. Remove and replace noncomplying windows and retest as specified above.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.5 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Self-flashing unit skylights with curbs.

B. Related Requirements:

1. Division 1 Section "Submittal Procedures" for submittal requirements.
2. Division 1 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
3. Division 1 Section “Quality Requirements” for Owner’s Building Envelope Consultant.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of unit skylight.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for unit skylights.

B. Sustainable Design Submittals:

1. Refer to Section 01 81 15, LEED Design Requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Shop Drawings: For unit skylight work.

1. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.

D. Aluminum Finish Samples: For each type of exposed finish required, in a representative section of each unit skylight in manufacturer's standard size.

E. Glazing Samples: For each color and finish of glazing indicated, 12 inches (300 mm) square and of same thickness indicated for the final Work.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified **Installer and manufacturer**.

B. Product Test Reports: For each type and size of unit skylight, for tests performed within the last four years by a qualified testing agency. Test results based on testing of smaller unit skylights than specified will not be accepted.

C. Field quality-control reports.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For unit skylights to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating unit skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

B. Installer Qualifications: An installer acceptable to unit skylight manufacturer for installation of units required for this Project.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Uncontrolled water leakage.
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
c. Yellowing of acrylic glazing.
d. Breakage of polycarbonate glazing.
e. Deterioration of insulating-glass hermetic seal.

2. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Kingspan Light + Air, Santa Ana, CA. or Approved Equal

B. Basis of Design Product: Tufflite skylight Model No. ALIB -SF-WPC- C16MMMW-MF

2.2 PERFORMANCE REQUIREMENTS

A. Unit Skylight Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

B. Thermal Transmittance: NFRC 100 maximum U-factor of **0.44 Btu/sq. ft. x h x deg F**.

C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC of **0.40**.

D. Minimum Visual Transmittance value: 58%.

2.3 UNIT SKYLIGHTS

A. General: Provide factory-assembled unit skylights that include glazing, extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding performance requirements indicated.

B. The skylight shall be fully factory assembled consisting of a monolithic or prismatic polycarbonate outer dome plus a structural multiwall polycarbonate inner panel with a CC-1 classifcation.

C. The skylight frame shall be fabricated from 6063-T5 heliarc welded aluminum with an integral condensate channel to carry moisture to the exterior.

D. The aluminum retaining cap fasteners shall be corrosion resistant.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Provide thermally broken curb frame with AAMA Compliant polyurethane thermal break material to prevent thermal losses through the frame and the formation of condensation on its interior surfaces. Fabricate thermally broken, self flashing frame from aluminum with a 2-3/4" roof nailing flange and 1" of insulation inside a PVC frame with a white aluminum liner on the interior.

1. Provide with EPDM Curb Sealing tape
2. Curb Height: 18" as required

F. Unit Shape and Size: As indicated, Rectangular, 24-by-48-inch (610-by-1220-mm) inside curb.

G. Glazing Gaskets: Manufacturer's standard interior and exterior gaskets

2.4 ACCESSORY MATERIALS

A. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal as recommended by manufacturer. Finish exposed fasteners to match material being fastened.

1. Where removal of exterior exposed fasteners might allow access to building, provide nonremovable fastener heads.

B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.5 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with **AAMA 2604** and containing not less than **70** percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: **As selected by Architect from manufacturer's full range**.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.2 INSTALLATION

A. Coordinate installation of unit skylight with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.

B. Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for installing unit skylights.

C. Install unit skylights level, plumb, and true to line, without distortion.

D. Anchor unit skylights securely to supporting substrates.

E. Where aluminum surfaces of unit skylights will contact another metal or corrosive substrates, such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or provide other approved permanent separation recommended in writing by unit skylight manufacturer.

3.3 FIELD QUALITY CONTROL

A. After completion of installation and nominal curing of sealant and glazing compounds but before installation of interior finishes, test for water leaks according to AAMA 501.2.

B. Perform test for total area of each unit skylight.

C. Work will be considered defective if it does not pass tests and inspections.

D. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

E. Prepare test and inspection reports.

3.4 CLEANING

A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.

B. Remove excess sealants, glazing materials, dirt, and other substances.

C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

E. Unit Skylight Operating System: Clean and lubricate joints and hardware. Adjust for proper operation.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. Work under this section includes finishing and installing the finish and security hardware requirements for the project. Items not specifically mentioned but necessary to complete the work, shall be furnished, matching the items specified in quality, and finish.

B. Key Abbreviations: The following Key abbreviations apply to this section:

1.	HW	Hardware
2.	MHO	Magnetic Hold Open
3.	PH	Panic Hardware
4.	RM	Removable Mullion
5.	TH	Threshold

C. Related Sections:

1. Steel Doors and Frames covered under Section 08 11 13.
2. Flush Wood Doors covered under Section 08 14 16.
3. Folding Aluminum-Framed Glass Doors covered under Section 08 35 00.
4. Aluminum Framed Entrances and Storefronts covered under Section 08 41 13.
5. Fiberglass Windows and Storefronts covered under Section 08 54 13.

1.3 QUALITY CONTROL

A. Supplier: Finish Hardware shall be supplied by recognized builder's hardware supplier who has been furnishing hardware in the same area as the project for a period of not less than two years. The supplier's organization shall include a member of the American Society of Architectural Hardware Consultants who is available at all reasonable times during the course of the work to meet with the Owner, Architect, or Contractor for project hardware consultation. Supplier shall be located within 200 miles of the project. Supplier shall be a distributor for the specified products, not a broker. Supplier shall maintain a warehouse and stock of specified hardware and replacement parts.

B. Installer: Finish Hardware shall be installed only by experienced tradesmen in compliance with trade union jurisdictions, either at the door and frame fabrication plant or at the project site.

C. Codes: All Finish Hardware shall comply with applicable local and/or state current building codes. Hardware for fire-rated openings shall also be in compliance with all fire building codes

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

applicable to the district in which the building is located. Provide only hardware which has been tested and listed by UL for the types and sizes of doors required, and which complies with the requirements of the Door and Door Frame Labels.

1.4 ACTION SUBMITTALS

A. Product Data: Submit Manufacturer's Product Data for each item of finish hardware.

B. Hardware Schedule:

1. Organized into "Hardware Sets" and indicating complete designation of every item required for each door or opening. List in a vertical form. Review of hardware schedule does not relieve the Contractor of responsibility to fulfill project requirements in accordance with contract documents.
2. Schedule must be in vertical form, including all quantities, stock numbers, finishes, and sizes. List hardware for each door opening separately. Schedules prepared in a coded form are not acceptable and will be returned without review.

FORMAT OF SCHEDULE:

Heading 5

1 single Door 5 Corridor 1120 from Dental Lab 1320 – RHR 110
3'0 x 7'0 x 1-3/4" Wd x Hm HW-4

1-1/2 Pr.	Butts	TA2714 26D 4-1/2 x 4-1/2
1	Lockset	45H7INL 15M x 32D
1	Closer	QDC115- 689
1	Kick Plate	5153 12 x 34 (Push Side)
1	Wall Stop	QU W307 26D
3	Silencers	IV 20R

3. After the schedules have been reviewed, distribute corrected schedules to Owner and Architect.

C. Templates: Furnish hardware templates for fabricators of doors, frames and other work to be factory prepared for hardware. Upon request, check shop drawings of such other work to confirm that adequate provisions will be made for the prior installation of hardware.

D. Provide electrical drawings & point to point drawings for electric hardware.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For all door hardware products with sequence of items, materials and methods used for proper cleaning and maintenance of each item.

1.6 PRODUCT HANDLING AND STORAGE

A. Packaging: Each item or package is to be separately tagged with identification related to final hardware schedule. Basic installation instructions shall be included.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Storage: Provide locked room at the jobsite for storage of hardware.

1.7 GUARANTEE

A. Finish hardware shall be guaranteed against defects in workmanship and operation for a period of one year, backed by a factory guarantee of the hardware manufacturer, except the door closers shall be so guaranteed for ten years. No liability shall be assumed by the hardware supplier where faulty operation is due to improper installation or failure to exercise normal maintenance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Items used are from the catalogs of:

1. ABH
2. Best
3. Rockwood
4. Dormakaba
5. Pemko
6. Detex
7. Record
8. Cavity sliders
9. Securitron
10. Precision
11. Stanley

B. Except as shown in the following paragraphs, no other substitutions are allowed.

2.2 HINGES

A. Manufacturer Listed: Stanley

1. Acceptable Substitutions: Hager, Mckinney
2. Finish: US32D Satin Stainless Steel exterior / US26D Satin chrome interior.
3. Type as listed.
4. Exterior hinges will have NRP pins.

B. Continuous Hinges listed: Pemko

1. Acceptable substitutions: Markar, ABH
2. Finish: 628 aluminum
3. Type as listed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.3 MORTISE LOCKS

A. Manufacturer Listed: Best 45H series mortise.

1. Acceptable Substitutions: None
2. Design: Lever 15H
3. Finish: US32D (Satin Stainless)
4. All locksets and latchsets shall be the product of one manufacturer

2.4 CYLINDERS

A. Manufacturer Listed: Best interchangeable core x Cormax patiented

1. Acceptable Substitutions: None
2. Finish: US26D (Satin Chrome).
3. Provide cylinders for all key operated locks, exit devices and mullions.

2.5 EXIT DEVICES AND MULLIONS

A. Manufacturer Listed: Precision

1. Acceptable Substitutions: None
2. Finish: US32D (Satin Stainless) mullions prime coat.
3. Provide lever handles where noted to match mortise locksets.
4. Provide shim kits as required to clear projecting lite frames.
5. Provide keyed mullion box type 2"x3" at all locations.
6. Provide through bolts at all wood doors.

2.6 DOOR CLOSERS, SURFACE

A. Manufacturer Listed: Dormakaba QDC100

1. Acceptable Substitutions: None
2. Finish: Sprayed to match adjoining hardware.
3. Provide drop plates where required.
4. Provide extra duty arms QDC115 push side mount
5. Provide regular arms QDC111-REG pull side mount.
6. Furnish sex nuts and bolts for wood doors
7. Furnish shoe supports for all closers.
8. Provide closers with proper spring power adjustment to meet ADA.
9. Provide special closer mounting as required where interference with weatherstrip or sound seal occurs. Do not notch Weather Strip at frame head for closer foot.

2.7 AUTO DOOR OPERATOR

A. Manufacture Listed: Record 8100 X Full width header

1. Acceptable Substution: None

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Door operator must be installed by a factory certified installer.
3. Certified installer = Western Entrance Technology ph# 360-863-9382.

2.8 KICK PLATES, PUSH & PULLS

A. Manufacturer Listed: Rockwood

1. Acceptable Substitutions: Trimco, ABH, Tice.
2. Finish: US32D (Satin Stainless)
3. Size: All plates shall be 2" less than door width on push side of door, except pairs of doors shall be 1" less than door width.
    a. Kick Plates shall be 10" in height
    b. Armor Plates shall be 34" in height
    c. Mop Plates shall be 6" in height

2.9 STOPS, HOLDERS, AND MISCELLANEOUS

A. Manufacturer Listed: Rockwood

1. Acceptable Substitutions: Tice, Trimco,
2. Finish: US26D (Satin Chrome).
3. Type:
    a. Wall Stops: 400
    b. Floor Stops: 445
4. Provide stops to protect all walls, cabinet work or hardware operation.
5. Wall stops shall be used wherever possible, unless otherwise called for in hardware sets.
6. Where wall stops are not applicable, furnish floor stop or vise-versa. Provide proper height floor stops to suit conditions.
7. Contractor to provide solid blocking for all wall mounted stops.
8. Provide 30 extra floor stops 445 for use where wall stop won't work.
9. At the end of the job turn over all extra wall and floor stops to the owner.

2.10 OVERHEAD STOPS

A. Manufacture Listed: ABH

1. Acceptable Substitutions: Sargent, Rockwood
2. Finish: US32D Satin Stainless
3. Provide proper size and degree of swing to suit conditions.

2.11 WEATHERSTRIP AND THRESHOLD

A. Manufacturer Listed: Pemko

1. Acceptable Substitutions: National Guard.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2. Finish:

   a. Weatherstripping: Clear Anodized Aluminum.
   b. Thresholds: Mill Finish Aluminum.

3. Where smoke gasket is specified, provide Pemko S88D
4. Provide Pemko FHSL-14 anchors for all thresholds.

2.12 DOOR SILENCERS

A. Manufacturer Listed: Rockwood

1. Acceptable Substitutions: Trimco, ABH.
2. Type: 608
3. Quantity: Furnish three (3) for each single door frame, and four (4) for each pair of door frames.

2.13 KEYING

A. Keying shall be provided directly to the owner by Best lock Co. Permanent Cores and Keys shall be sent direct from the lock manufacture via Registered Mail, Return Receipt Requested, to the Owner.

1. Supply brass construction cores during construction. Provide permanent cores to the owner. The Owner will install the permanent cores
2. Provide Keys:

   a. Four Building Grand Master Keys.
   b. Four Master Keys per set.
   c. Two Change Keys per Lockset or Cylinder.
   d. Two Control Keys.
   e. Two Construction Control Keys
   f. Six Construction Keys.

B. Best interchangeable cores will be Cormax patiented

C. Provide two copies of corrected Finish Hardware Schedules along with two each Construction Master and Control Keys, 90 days prior to Substantial Completion to the owner

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation by skilled mechanics to architect's satisfaction.

1. Conform strictly to manufacturer's templates and directions.
2. Conform to referenced IBC and UL requirements.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Adjust movable parts to operate perfectly at time of final acceptance.

1. Make further adjustments required during guarantee period.

C. Replace hardware which has been damaged by use when damage is caused by faulty installation.

D. Make mortises accurately to exactly receive hardware. Depth or Mortises such that hardware is flush with finish surfaces.

E. Fasteners: Drill appropriate size guide holes for all wood screws. Drill and tap metal doors and frames to receive manufacturer's machine screws.

1. Do not use sheet metal or "TEK" screws to install hardware.
2. Self tapping screws will not be allowed.
3. Use cast-in-place anchor bolts or steel expansion shield for all items supported by, or on, concrete.
4. Do not use through bolted fasteners that are exposed on the face of doors. Coordinate all hardware with door manufacturer for blocking locations

F. Place door stops and holders to allow maximum swing.

1. Doors not to contact anything but stop.

G. Thresholds: Cut and fit thresholds to profiles of door jambs with mitered corners and precision joints.

1. Set exterior thresholds in bed of butyl rubber sealant and fill all voids to exclude moisture.
   a. Do not block any weep holes
   b. Remove excess sealant.
2. Align the bevel of exterior thresholds with exterior face of door, unless detailed otherwise.
3. Thresholds shall be installed level.

H. Hardware Placement: Locate hardware on doors as follows:

1. Comply with accessibility code where more stringent requirements are indicated.
2. Dimensions are from the finished floor to centerline unless shown otherwise.
   a. Lock/Latch: 40" centerline of strike.
   b. Exit Device Cross Bar: 40" centerline of bar
   c. Deadlock Cylinder: 48"
   d. All other items are manufacturer's instructions or as directed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.2 HARDWARE GROUPS

Hardware Group 1
Doors: 100A

1	EA	Continuous Hinge CFM83SLI-HD1 PT
1	EA	Rim Exit Device MLR TS 2403 xNCA-03 No Trim 630
1	EA	Cylinder 12E-72 S2 RP 626 Patented
1	EA	Construction Core IC7 Green
1	EA	Door Pull BF157 Mtg-Type 12HD US32D
1	EA	Surface Closer QDC115 689
1	EA	Drop Plate 8Q00471 689
1	EA	Screw Pack 8Q00473 689
1	EA	Spacer P45HD-110 689
1	EA	Door Stop 471 US26D
1	EA	Threshold 2727A x 36" FHSL14
1	EA	Sweep 315CN x 36"
1	EA	Electric Power transfer CEPT-10
2	EA	Cable WH-192P
1	EA	Power Supply RPSMLR2
1	EA	Card Reader By security

Card reader unlocks electric latch retraction panic.

Hardware Group 2
Doors: 101A

1	EA	Continuous Hinge CFM83SLI-HD1
1	EA	Door Pull BF157 Mtg-Type 12HD US32D
1	EA	Push Bar 47-PB x type12HD 33" US32D
1	EA	Surface Closer QDC115 689
1	EA	Drop Plate 8Q00471 689
1	EA	Screw Pack 8Q00473 689
1	EA	Spacer P45HD-110 689
1	EA	Wall Stop 400 US26D
1	EA	Gasketing S88D 18'
1	EA	Sweep 315CNB x 36"

Hardware Group 3
Doors: 103A

1	EA	Continuous Hinge CFM83SLI-HD1 PT
1	EA	Electrified Mort lock 45HW7DEU 15H 630 Patented RQE
1	EA	Surface Closer QDC111- REG 689
1	EA	Wall Stop 400 US26D
1	EA	Electric Power transfer CEPT-10
2	EA	Cable WH-192P
1	EA	Card Reader By security

Card reader unlocks electric lock.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Hardware Group 4
Doors: 102A, 108A, 121A, 130A, 131A, 132A, 133A

3	EA	Hinge, Full Mort	FBB179 4-1/2" x 4-1/2" US26D
1	EA	Mortise Lock	45H0L 15H 630 VIN
1	EA	Kick Plate	K1050 10" x 34" US32D
1	EA	Wall Stop	400 US26D
1	EA	Gasketing	S88D 18'

Hardware Group 5
Doors: 104A

3	EA	Hinge, Full Mort	FBB179 4-1/2" x 4-1/2" US26D
1	EA	Mortise Lock	45H0N 15H 630 VIN
1	EA	Kick Plate	K1050 10" x 34" US32D
1	EA	Wall Stop	400 US26D
1	EA	Gasketing	S88D 18'

Hardware Group 6
Doors: 107A

1	EA	Continuous Hinge	CFM83SLI-HD1 PT
1	EA	Rim Exit Device	MLR TS 2403 xNCA-03 No Trim 630
1	EA	Cylinder	12E-72 S2 RP 626 Patented
1	EA	Construction Core	IC7 Green
1	EA	Door Pull	BF157 Mtg-Type 12HD US32D
1	EA	Screw Pack	8Q00473 689
1	EA	Spacer	P45HD-110 689
1	EA	Electric Power transfer	CEPT-10
2	EA	Cable	WH-192P
1	EA	Power Supply	RPSMLR2
1	EA	Card Reader	By security

Card reader unlocks electric latch retraction panic.

Hardware Group 7
Doors: 106A

1	EA	Door Pull	110-RKW US32D
1	EA	Flush Pull	95A US26D
1	EA	Sliding track	TSWMNA-12
2	EA	Hangers	DKMO821
1	EA	Floor guide	T guide

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Hardware Group 8
Doors: 122A

4	EA	Hinge, Full Mortise FBB199 NRP 4-1/2" x 4-1/2" US32D
1	EA	Electrified Mort lock 45HW7DEU 15H 630 Patented RQE
1	EA	Surface Closer QDC115 689
1	EA	Kick Plate K1050 10" x 34" US32D
1	EA	Door Stop 471 US26D
1	EA	Threshold 2727A x 36" FHSL14
1	EA	Gasketing S88D 18'
1	EA	Sweep 315CN x 36"
1	EA	Electric Power transfer CEPT-10
2	EA	Cable WH-192P
1	EA	Power Supply RPSMLR2
1	EA	Card Reader By security

Card reader unlocks electric lock.

Hardware Group 9
Doors: 109A, 109B, 119A, 119B

4	EA	Hinge, Full Mortise FBB168 4-1/2" x 4-1/2" US26D
1	EA	Rim Exit Device FL 2114 4914A x36" 630
1	EA	Surface Closer QDC115 689
1	EA	Armor Plate K1050 34" x 34" US32D
1	EA	Wall Stop 400 US26D
1	EA	Threshold 276A x 36" FHSL14
1	EA	Gasketing S88D 18'
1	EA	Sweep 315CN x 36"

Hardware Group 10
Doors: 112A

4	EA	Hinge, Full Mortise FBB179 4-1/2" x 4-1/2" US26D
1	EA	Electrified Mortise lock 45HW7DEU 15H 630 Patented RQE
1	EA	Construction Core IC7 Green
1	EA	Surface Overhead stop 9024 US32D
1	EA	Armor Plate K1050 34" x 34" US32D
3	EA	Silencer 608-RKW
1	EA	Electric Power transfer CEPT-10
1	EA	Card Reader By security

Card reader unlocks electric latch retraction panic.

Hardware Group 11
Doors: 118A

3	EA	Hinge, Full Mortise FBB168 4-1/2" x 4-1/2" US26D
1	EA	Mortise Lock 45H0N 15H 630
1	EA	Surface Closer QDC111- REG 689
1	EA	Armor Plate K1050 34" x 34" US32D
1	EA	Wall Stop 400 US26D
3	EA	Silencer 608-RKW

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Hardware Group 12
Doors: 115A, 117A, 134A

3	EA	Hinge, Full Mortise FBB179 4-1/2" x 4-1/2" US26D
1	EA	Mortise Lock 45H0N 15H 630
1	EA	Surface Closer QDC111- REG 689
1	EA	Kick Plate K1050 10" x 34" US32D
1	EA	Wall Stop 400 US26D
1	EA	Gasketing S88D 18'

Hardware Group 13
Doors: 113A

3	EA	Hinge, Full Mortise FBB179 4-1/2" x 4-1/2" US26D
1	EA	Rim Exit Device FL 2103 4903A 630
1	EA	Cylinder 12E-72 S2 RP 626 Patented
1	EA	Construction Core IC7 Green
1	EA	Surface Closer QDC115 689
1	EA	Wall Stop 400 US26D
1	EA	Gasketing S88D 18'

Hardware Group 14
Doors: 122B

3	EA	Hinge FBB168 4-1/2" x 4-1/2" US26D
1	EA	Mortise Lock 45H0N 15H 630
1	EA	Surface Closer QDC115 689
1	EA	Wall Stop 400 US26D
1	EA	Kick Plate K1050 10" x 34" US32D
3	EA	Silencer 608-RKW

Hardware Group 15
Doors: 120D, 120H

4	EA	Hinge, Full Mortise FBB199 NRP 4-1/2" x 4-1/2" US32D
1	EA	Rim Exit Device MLR TS 2103 1703A x36" 630
1	EA	Cylinder 12E-72 S2 RP 626 Patented
1	EA	Construction Core IC7 Green
1	EA	Surface Closer QDC115 689
1	EA	Kick Plate K1050 10" x 34" US32D
1	EA	Door Stop 471 US26D
1	EA	Threshold 2727A x 36" FHSL14
1	EA	Gasketing S88D 18'
1	EA	Sweep 315CN x 36"
1	EA	Electric Power transfer CEPT-10
1	EA	Cable WH-192P
1	EA	Cable WH-44P
1	EA	Power Supply RPSMLR2
1	EA	Card Reader By security

Card reader unlocks electric latch retraction panic.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Hardware Group 16
Doors: 140A

1	EA	Continuous Hinge	CFM83SLI-HD1
1	EA	Door Pull	BF157 Mtg-Type 12HD US32D
1	EA	Push Bar	47-PB x type12HD 33" US32D
1	EA	Surface Closer	QDC115 689
1	EA	Drop Plate	8Q00471 689
1	EA	Screw Pack	8Q00473 689
1	EA	Spacer	P45HD-110 689
1	EA	Door Stop	445 US26D
1	EA	Gasketing	S88D 18'

Hardware Group 17
Doors: 140B

1	EA	Continuous Hinge	CFM83SLI-HD1 PT
1	EA	Rim Exit Device	MLR TS 2403 xNCA-03 No Trim 630
1	EA	Cylinder	12E-72 S2 RP 626 Patented
1	EA	Construction Core	IC7 Green
1	EA	Door Pull	BF157 Mtg-Type 12HD US32D
1	EA	Surface Closer	QDC115 689
1	EA	Drop Plate	8Q00471 689
1	EA	Screw Pack	8Q00473 689
1	EA	Spacer	P45HD-110 689
1	EA	Door Stop	471 US26D
1	EA	Threshold	2727A x 36" FHSL14
1	EA	Sweep	315CN x 36"
1	EA	Electric Power transfer	CEPT-10
2	EA	Cable	WH-192P
1	EA	Power Supply	RPSMLR2
1	EA	Card Reader	By security

Card reader unlocks electric latch retraction panic.

Hardware Group 18
Doors: 124B, 125B, 126B, 127B, 136B, 137B, 138B, 139B

1	EA	Door Pull	110-RKW US32D
1	EA	Flush Pull	95A US26D
1	EA	Sliding track	TSWMNA-12
2	EA	Hangers	DKMO821
1	EA	Floor guide	T guide

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

Hardware Group 18
Doors: 124A, 125A, 126A, 127A, 136A, 137A, 138A, 139A

3	EA	Hinge, Full Mortise FBB179 4-1/2" x 4-1/2" US26D
1	EA	Mortise Lock 45H0N 15H 630 VIN
1	EA	Surface Overhead stop 9024 US32D
1	EA	Surface Closer QDC111- REG 689
1	EA	Kick Plate K1050 10" x 34" US32D
1	EA	Gasketing S88D 18'

Hardware Group 19
Doors: 135A

4	EA	Hinge, Full Mortise FBB199 NRP 4-1/2" x 4-1/2" US32D
1	EA	Rim Exit Device FL 2100 4903A 630 (Exit only)
1	EA	Cylinder 12E-72 S2 RP 626 Patented
1	EA	Construction Core IC7 Green
1	EA	Surface Closer QDC115 689
1	EA	Kick Plate K1050 10" x 34" US32D
1	EA	Door Stop 471 US26D
1	EA	Threshold 2727A x 36" FHSL14
1	EA	Gasketing S88D 18'
1	EA	Sweep 315CN x 36"

Hardware Group 20
Doors: G1

1	EA	Mortise Lock 45H0NX 15H 630 VIN (exit Only)
1	EA	Surface Closer QDC115 689
1	EA	Drop Plate 8Q00471 689
1	EA	Screw Pack 8Q00473 689

Hardware Group 21
Doors: G2

1	EA	Mortise Lock (mechanical keypad lock)
1	EA	Surface Closer QDC115 689
1	EA	Drop Plate 8Q00471 689
1	EA	Screw Pack 8Q00473 689

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Wood and Hollow Metal Doors.
2. Hollow Metal Framed sidelites borrowed lites and transoms.
3. Aluminum Storefront systems and Entrances
4. Folding Aluminum-Framed Glass Doors
5. Sectional Overhead Doors
6. Fiberglass Windows and Storefronts

B. Related Sections include the following:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Section 01 40 00 “Quality Requirements” for Owner’s Building Envelope Consultant
3. Section 08 11 13 “Hollow Metal Doors and Frames”
4. Section 08 14 16 “Flush Wood Doors”
5. Section 08 32 00 “Folding Aluminum Framed Glass Doors”
6. Section 08 32 13 “Quick Response Four-fold doors”
7. Section 08 36 13 “Sectional Overhead Doors”
8. Section 08 54 13 “Fiberglass Windows and Storefronts”
9. Section 08 41 13 "Aluminum Framed Entrances and Storefronts"
10. Section 08 83 00 "Mirrors"

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

   a. Specified Design Wind Loads: As indicated.

      1) Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
      2) Load Duration: 60 seconds or less.

   b. Maximum Lateral Deflection: Limit center-of-glass deflection to the smallest of the following:

      1) The displacement associated with the structural capacity of the glazing unit.
      2) L/100 where L is the shortest side dimension of the unit measured in inches
      3) 3/4"

   c. Minimum Glass Thickness for Exterior Lites: Not less than 1/4 inch (6.0 mm).

   d. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Thermal Loading: Design glass to resist thermal loads at service including those induced by differential shading within individual glass lites

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. Safety Glazing: Provide safety glazing as required by applicable codes, whether or not indicated in project drawings.

2. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.

3. Typical insulated glass units required, shall be as indicated in Part 2 Articles, nominal units as required by Manufacturer for frame type and weight requirements and performance values.

4. Center-of-Glass Values: NFRC Labeled based on using LBL-44789 WINDOW 5.2 computer program for the following methodologies:

a. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
b. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
c. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
d. Air Infiltration: NFRC 400.

1.6 SUBMITTALS

A. Submit in accordance with section 01 3300, submittal requirements and as noted below

B. Product Data: For each glass product and glazing material indicated.

C. Insulated glass units, Include NFRC values for thermal resistance (U-Values), solar heat gain (SHGC), Visual Transmittance (VT) and Air Infiltration.

D. Sustainable Design Submittals:

1. Product Data for Credit EQ 4.1: For glazing sealants used inside of the weatherproofing system, including printed statement of VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials
3. Product Data for Credit EQ 4.2: For spandrel glass coating used, including printed statement of VOC content.

E. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass and of 12-inch- (300-mm-) long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass.

1. Insulating glass for each designation indicated.
2. For each color (except black) of exposed glazing sealant indicated.

G. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

H. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacture.

I. Qualification Data: For installers.

J. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

K. Product Test Reports: For each of the following types of glazing products:

1. Float glass.
2. Insulating glass.
3. Glazing sealants.
4. Glazing gaskets.

L. Maintenance Data: For glazing to include in maintenance manuals.

M. Warranties: Special warranties specified in this Section.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Source Limitations for Insulated Glass: Where a glass manufacturer is specified, obtain insulated glass in fabricated units from a manufacturer whose specific location and equipment is certified by the coating manufacturer.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

D. Source Limitations for Spandrel Glass: Where spandrel glass coatings of a coating manufacturer that has established a certified manufacturer and fabricator program is specified, obtain spandrel coating from a manufacturer and fabricator that is certified by coated-glass manufacturer.

E. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

F. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

G. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
3. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
4. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

H. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. (0.84 sq. m) in area, provide glazing products that comply with Category II materials, and for lites 9 sq. ft. (0.84 sq. m) or less in area, provide glazing products that comply with Category I or II materials.

I. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.
2. Associated Laboratories, Inc.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

K. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

C. Take exceptional care to prevent edge damage to glass, and damage/deterioration to coatings on glass.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT per ASTM C 1048 (fully tempered) complying with CPSC 16CFR-1201; ANSI Z 97.1 where tempered safety glass is indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

B. Sputter or Pyrolitic-Coated Low-E Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.

C. Ceramic-Coated Vision Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in NGA's "Engineering Standards Manual."

1. Coated silk-screened glass as provided by manufacturer
2. Ceramic Frit Coating on #2 surface
3. Pattern: as indicated on drawings
4. Color: White

D. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
2. Provide Kind FT (fully tempered) glass lites where tempered safety glass is indicated.
3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
4. Provide Argon as required to meet whole unit energy performance
5. Sealing System: Dual seal, with primary and secondary sealants as follows:
   a. Primary Seal: Polyisobutylene
   b. Secondary Seal: Silicone
6. Spacer Specifications: tubular low conductivity stainless steel spacer-bar with sealed corners.

2.2 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Class 25 Neutral-Curing Silicone Glazing Sealant:
   a. Available Products subject to compliance with requirements that may be incorporated into the work, but not limited to, the following:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

b. Dow Corning Corporation; 799.
c. GE Silicones; UltraGlaze SSG4000.
d. GE Silicones; UltraGlaze SSG4000AC.
e. Polymeric Systems Inc.; PSI-631.
f. Schnee-Morehead, Inc.; SM5731 Poly-Glaze Plus.
g. Tremco; Proglaze SG.
h. Tremco; Tremsil 600.
i. Or approved equal
j. Type and Grade: S (single component) and NS (nonsag).
k. Class: 25.
l. Use Related to Exposure: NT (nontraffic).
m. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
n. Use O Glazing Substrates: color anodic aluminum galvanized steel and wood.

2.3 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 807.3 tape, where indicated.

2.4 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Compressible Filler Rods: Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25% deflection..

G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.5 FABRICATION OF GLAZING UNITS

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

C. Grind smooth and polish exposed glass edges and corners.

2.6 GLAZING UNIT MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified:

1. Cardinal Glass Industries
2. NSG (Nippon Sheet Glass) /Pilkington
3. PPG Industries Inc.
4. VetroTech-Saint Gobain
5. Or Approved Equal

2.7 MONOLITHIC FLOAT-GLASS UNITS

A. Uncoated Clear Float-Glass Units: Class 1 (clear) Kind FT (fully tempered, where required) float glass.

1. Thickness: 1/4 inch (6.0 mm).

2.8 INSULATING-GLASS UNITS

A. Insulated glazing unit certified by IGMA. Glass thickness shall be in accordance with applicable Building Codes, but not less than 4mm. All insulated glass units shall be argon filled and utilize soft coat metallic low-E coating(s). Edge construction to consist of a primary seal of polyisobutylene; a tubular low conductivity stainless steel spacer-bar with sealed corners, filled with desiccant; and a secondary seal of neutral cure silicone. Performance requirements indicated in this section are for center-of-glass

1. Tempered Safety glass locations as required on drawings and by applicable building codes.

B. Triple Glazed Glazing: For fixed and operable Fiberglass Windows, Fiberglass Storefront systems (excluding windows at Apparatus bays) and sliding aluminum-framed glass doors. (1 3/8-inch (35 mm) nominal unit thickness)

1. Basis of Design Product: Cardinal LowE 366/180
2. Overall Unit Thickness: 1 3/8-inch (35 mm) as required by MFR for performance requirements
3. Minimum Thickness of Each Outer Glass Lite: 1/4 inch (6.0 mm).
4. Minimum Thickness of Interior Glass Lite: as required.
5. Glazing Lite: Annealed float glass.

a. Provide Kind HS per ASTM C 1048 (heat strengthened) in place of annealed glass where needed. To resist thermal stresses induced by differential shading

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

of individual glass lites and to comply with glass design requirements specified in Part 1, Performance Requirements.

b. Provide Kind FT (fully tempered) where "tempered" glass is required.

6. Interspace Content: Provide Argon.
7. Minimum Visual Transmittance value: 57%.
8. Thermal Performance Requirements: Shall meet whole unit performance values as required in related sections as determined in accordance with NFRC 100, 200 and 300.

   a. Center of Glass U-values and SHGC Performance determined in accordance with NFRC 100 and 200.

9. Maximum U-Value: 0.13 - See whole unit requirements
10. Maximum SHGC Value: 0.25 - See whole unit requirements
11. Low-E Coating: Sputtered or Pyrolitic coated on interior 2nd, or 5th surfaces only, as required for performance values.
12. Spacers: Manufacturer's spacer material and construction to maintain required distance between glass panes.

C. Double Glazed Glazing: For exterior aluminum entrances, Fiberglass Storefront systems at apparatus bays, exterior hollow metal doors and four-fold doors. (1 - inch nominal unit thickness)

1. Basis of Design Product: Cardinal LowE 366; or comparable product subject to compliance with requirements.
2. Overall Unit Thickness: 1 inch (25 mm). (unless otherwise noted)
3. Minimum Thickness of Each Glass Lite: 1/4 inch (6.0 mm).
4. Outdoor Lite: Annealed float glass.

   a. Provide Kind HS (heat strengthened) in place of annealed glass where needed. To resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1, Performance Requirements.
   b. Provide Kind FT (fully tempered) where "tempered" glass is required.

5. Interspace Content: Provide Argon as required to meet whole unit energy performance.
6. Indoor Lite: Annealed float glass.

   a. Provide Kind HS (heat strengthened) in place of annealed glass where needed. To resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1, Performance Requirements.
   b. Provide Kind FT (fully tempered) where "tempered" glass is required.

7. Minimum Visual Transmittance value: 65%.
8. Thermal Performance Requirements: Shall meet whole unit performance values as required in related sections as determined in accordance with NFRC 100, 200 and 300.

   a. Center of Glass U-values and SHGC Performance determined in accordance with NFRC 100 and 200.
   b. Maximum U-Value: 0.24; See whole unit requirements

9. Maximum SHGC Value: 0.27; See whole unit requirements
10. Low-E Coating: Sputtered or Pyrolitic coated on interior 2nd, or 3rd surfaces only, as required for performance values.
11. Ceramic Coating: Artwork Where indicated on drawing, coated on interior 2nd surface

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

D. Double Glazed Glazing for Steel and Aluminum Overhead Doors: Solar Control Low-E Tinted Insulating Glass Units (1/2" overall unit thickness).

1. Basis of Design Product: Cardinal LowE 366; or comparable product subject to compliance with requirements.
2. Overall Unit Thickness and Thickness of Each Lite: 1/2" min.
3. Interspace Content: 90% Argon and 10%air.
4. Outdoor Lite: Class 2 (tinted) float glass.
    a. Tint Color: As selected by Architect from samples of manufacture's full line of colors. Where indicated.
    b. Kind FT (fully tempered).
5. Indoor Lite: Class 1 clear float glass.
    a. Kind FT (fully tempered).
6. Low-E Coating: Sputtered on interior surface(s) only as required for performance values.
7. Winter Nighttime U-Factor: 0.38 maximum.
8. Solar Heat Gain Coefficient: 0.40 maximum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Wear cotton or rubber gloves when handling translucent glazing panels

E. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

F. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

G. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

H. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

I. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

J. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

M. Maintain a 1" to 2" air gap between spandrel glass and insulation or other materials.

N. Use only neutral cure silicone adhesives and only one kind of adhesive in any spandrel cavity.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer. Apply special attention to protecting spandrel glass and translucent panels from paint and sealants, abrasion or other possible damage from other trades.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Remove and replace insulated glass units that show evidence of hermetic seal ruptures.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

F. Remove and replace coated glass units that show evidence of damage or degradation of surface coating.

G. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of silvered flat glass mirrors.

1. Monolithic Glass Mirrors.

B. Related Sections include the following:

1. Division 01 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 06 Section "Rough Framing" for blocking
3. Division 10 Section “Toilet and Bath Accessories”

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Deterioration of Mirrors: Defects developed from normal use that is attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1.5 PERFORMANCE REQUIREMENTS

A. Provide mirrors that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.

1.6 SUBMITTALS

A. Submit in accordance with section 01 33 00, submittal requirements and as noted below

B. Product Data: For the following:

1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
2. Mirror mastic.
3. Mirror hardware.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

C. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials

D. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

E. Samples: For each type of mirror product required, in the form indicated below:

1. Mirrors, 12 inches (300 mm) square including edge treatment on 2 adjoining edges.
2. Mirror clips.
3. Mirror trim, 12 inches (300 mm) long.

F. Qualification Data: For Installer.

G. Mirror Mastic Compatibility Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing, paint [film] and substrates on which mirrors are installed.

H. Warranty: Special warranty specified in this Section.

I. Maintenance Data: For mirrors to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed mirror glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in mirror installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under NGA's Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Source Limitations for Mirrors: Obtain mirrors from one source for each type of mirror indicated.

C. Source Limitations for Mirror Glazing Accessories: Obtain mirror glazing accessories from one source for each type of accessory indicated.

D. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form, made out to Owner and signed by mirror manufacturer agreeing to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film:

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRROR

A. Glass Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Gilded Mirrors, Inc.
b. Guardian Industries Corp.
c. Messer Industries, Inc.
d. Sunshine Mirror.
e. Walker Glass Co., Ltd.
f. Or Approved equal.

B. Clear Glass Mirrors: ASTM C 1503, Mirror Glazing Quality, ultraclear (low-iron) float glass with a minimum 91 percent visible light transmission.

1. Nominal Thickness: 6.0 mm.
2. Refer to Drawings for locations
3. Size: As shown on drawings

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.2 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Franklin International; Titebond Division.
b. Laurence, C. R. Co., Inc.
c. Macco Adhesives; Liquid Nails Division.
d. OSI Sealants, Inc.
e. Palmer Products Corporation.
f. Pecora Corporation.
g. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
h. Sommer & Maca Industries, Inc.
i. Or Approved Equal

2.3 MIRROR HARDWARE

A. Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom edges of each mirror in a single piece.

1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.05 inch.

2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Bottom Trim:

1) Laurence, C. R. Co., Inc.; CRL Standard "J" Channel.
2) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar.
3) Or Approved Equal.

B. Mirror Top Clips: CRL 5/8" Wide Beveled Mirror Clips, Chrome Finish, by CR Laurence Co., Inc. or approved equal.

C. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

D. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls, restrooms, shower rooms and where indicated.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.4 FABRICATION

A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes. Field verify all sizes prior to fabrication – refer to drawings.

B. Cutouts: Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Rounded polished edge.

1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.

2. Mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.

1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
2. Proceed with mirror installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. For wall-mounted mirrors, install mirrors with mastic and mirror hardware.

1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

2. For mirror hardware in the form of a continuous J-channel at bottom, fasten J-channel directly to wall.

3. Install mastic as follows:

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum, wall louvers.

B. Related Sections:

1. Division 1 Section “Sustainable Design Requirements” for applicable Sustainability requirements.
2. Division 1 Section “Quality Requirements” for Owner’s Building Envelope Consultant.
3. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.
4. Division 7 Section “Fluid Applied Water Resistive Barrier.”
5. Division 23 Sections for ducts, vents and dampers specified as a part of mechanical equipment.
6. Division 26 Sections for electrical power connections for motor-operated adjustable louvers.

1.3 LEED

A. This project is targeting LEED gold certification from the US Green Building Council. It is the contractor’s responsibility to familiarize themselves with this program, to determine which points in the system that are relevant for this project are influenced by their work, and to meet the requirements of those sections for this project. Review Section 01 81 13 for Low-emitting Materials, Regional Materials and Recycled Content submittal requirements.

1.4 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

1.5 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on a uniform pressure of 20 lbf/sq. ft. (957 Pa) acting inward or outward.

B. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7

1. Component Importance Factor is 1.5 or as currently required by local codes whichever is greater.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.

D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.6 SUBMITTALS

A. Sustainable Design Submittals

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost

B. Product Data: For each type of product indicated.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.
3. Show construction details of louvers required to be built in series and miters where occur.
4. Show connection details for ductwork and dampers.
5. Wiring Diagrams: For power, signal, and control wiring for motorized adjustable louvers and dampers.

D. Samples for Initial Selection: For units with factory-applied color finishes.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

E. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Louvers:

a. Greenheck
b. Ruskin Company; Tomkins PLC.
c. Construction Specialties, Inc.
d. Architectural Louvers.
e. Or approved equal.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Aluminum Castings: ASTM B 26/B 26M, Alloy 319.

D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

1. Use types and sizes to suit unit installation conditions.
2. Provide fasteners and clips as required for complete installation of units.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3. Provide gasketing or nylon washers between clips and dissimilar metals.

E. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

F. Sealant: Provide sealants per Section 07 92 00 and as required by manufacturer, for water tight installation

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Without exterior flange unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.

1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.

2. Exterior Corners: Prefabricated corner units with mitered and welded blades mullions at corners.

G. Provide subsills made of same material as louvers for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

I. Provide special louver configurations as indicated in the drawings as required.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Louvers which are indicated on the mechanical drawings and or architectural drawings shall be provided as if included on both drawings.

B. Horizontal Storm-Resistant Louver

1. Basis-of-Design Product: Subject to compliance with requirements, provide Greenheck Drainable Stationary Louver Model ESD-403 or equal.
2. Louver Depth: 4 inches(100 mm)
3. Size: As indicated on Mechanical drawings

1. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.081 inch (2.0 mm) for blades and 0.081 inch (2.0 mm) for frames.
2. Louver Performance Ratings: AMCA certified for water penetration and Air Performance conforming to these minimum requirements:
   a. Unit test size in accordance with AMCA 500: 48-inches by 48-inches:
   b. Free Area: Not less than 50%
   c. Free area size: 8.0 square feet
3. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.6 ALUMINUM FINISHES

A. Finish louvers after assembly. Kynar finish

B. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with **AAMA 2605** and containing not less than **70** percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Provide for three (3) custom colors and gloss finishes as provided by Architect

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

G. Attach blank-off panels with screws in shingle fashion for proper drainage. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.

H. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 07 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.
2. Provide 1 pint of touch-up paint for each finish selected.

END OF SECTION

Provided to Builders Exchange of WA, Inc. For usage Conditions Agreement see www.bxwa.com - Always Verify Scal