DIVISION 01
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Summary of Work and;
2. Project information;
3. Contract;
4. Sequencing/phasing;
5. Contractor's responsibilities and use of the premises;
6. Existing conditions;
7. Conflicts and Omissions in Drawings and Specifications;
8. Owner's use of the premises;
9. Owner furnished products;
10. Miscellaneous provisions.

B. Work includes:
1. 1928 Boiler Building:
   a. Seismic Retrofit and Exterior Restoration:
      1) Restore existing masonry, anchor ties, and repointing at entrances.
      2) Remove and reinstall existing stone parapet with seismic anchors.
      3) Remove top portion of chimney and install new weather cap.
      4) Reinforce remaining chimney.
      5) Install new roofing.
   b. New Interior Mezzanine Construction:
      1) Install new concrete slab and interior footings.
      2) Install new mezzanine floor framing and composite concrete floor.
      3) Install new stair and guardrail for mezzanine.
   c. Install new interior and exterior light fixtures.
2. 1974 Boiler Building Bathroom Addition:
   a. Renovate toilet rooms and concessions.
   b. Install new sewage pump in plaza.
   c. Install new deck and guardrail on roof for future outdoor classroom occupancy. Permit for Outdoor Classroom not included in Project scope.
   d. Install new electrical panel and distribution.
   e. Install new interior and exterior light fixtures.
3. Selective demolition indicated on Drawings.

1.02 PROJECT INFORMATION

A. Project Identification: Luther Burbank Park Boiler Building Phase LBB1.
1. Project Location/Address: 2040 84th Avenue, Mercer Island, WA.

B. Owner: City of Mercer Island.
1. Address: City of Mercer Island, 9611 SE 36th Street, Mercer Island, WA.
2. Contact: Paul West. Tel: 206.275.7833.

C. Architect: Cardinal Architecture PC.
1. Address: 1326 5th Avenue, Suite 440, Seattle, WA.
2. Contact: Jim Cary. Tel: 206.624.2365.

D. Background: The tall single-story Boiler Building and stack were constructed in 1928. In addition to other requirements, Work of this Section shall be performed under the guidelines of the Secretary of the Interior's Standards for the Treatment of Historic Properties.
1. It is the intent of this Contract that:

a. Repair and replacement materials shall match remaining historic construction in all physical and visual aspects including material, form, color, texture and workmanship.
b. As much of the historic material as possible shall be saved.
c. Perform work using the gentlest methods available. Prevent damage to materials and finishes to remain.
d. Sound historical materials will not be put at risk due to the work of this Section.

E. Due to the age of the building, it is assumed that lead paint is present. Perform repair work in conformance with regulations for lead paint disturbance and removal.

F. Contractor shall do no work beyond that described in the Contract Documents without first notifying the Architect or Owner and without receiving specific authorization from the Owner to proceed with the out of scope work.

1.03 CONTRACT FOR CONSTRUCTION

A. Contract: Construct work under a single lump-sum, fixed price Public Works Contract between the City of Mercer Island and the Contractor.
1. Administration of the Contract: The Architect will administer the Contract.

1.04 SEQUENCE/PHASING

A. Phasing: Work will be phased.
1. Phase 1: The work described in this Project Manual is Phase 1, and will have one Substantial Completion date. The scope includes the scope indicated above. The project will not be occupied at completion, and no Certificate of Occupancy will be issued. Interior fit-out and other requirements for occupancy will be addressed in subsequent phases.

B. Elements of construction within project described herein are intended as a summary of Phase 1 only. The work outlined shall not be regarded by the Contractor as an exhaustive definition of the scope of work.

1.05 CONTRACTOR RESPONSIBILITIES

A. Unless otherwise indicated, work and responsibilities include, but are not limited to the following:
1. Providing a full-time superintendent for the duration of the project.
2. Employing specialists having experience in similar construction projects and in sufficient numbers for supervision and coordination of construction activities, including those by subcontractors and suppliers, and as required to maintain the Construction Progress Schedule and complete the portions of the work by the dates indicated in the Construction Progress Schedule.
3. Providing and paying for labor, materials, equipment, tools, machines, facilities, and services necessary for proper execution, supervision and completion of work.
4. Performing initial review and certification that submittals are complete and comply with requirements of the Contract Documents before submitting to Architect for review.
5. Scheduling, conducting and recording required meetings.
6. Coordinating and scheduling work of subcontractors to expedite progress of the Project.
7. Contractor and subcontractors submitting bids for this Project shall thoroughly familiarize themselves with specified products and installation procedures and submit to Architect any objections (in writing) not later than 5 days prior to Bid Date. Submittal of Bid constitutes acceptance of products and procedures specified.
8. Using new materials, except as noted.

9. Maintaining and supervising safety precautions.
10. Compliance with all OSHA and WISHA requirements.
11. Maintaining security.
12. Maintaining required access, egress and other requirements in accordance with governing Codes and Ordinances throughout the work.
13. Paying required taxes.
14. Giving required notices.
15. Obtaining and paying for all required permits, fees and notices, and inspections by government agencies necessary for proper execution of the Work and required by Authorities Having Jurisdiction.
    a. The Owner will pay for construction permit fees.
16. Coordinate and schedule third party Special Inspections.
17. Objections to Application of Products: Contractor and subcontractors submitting bids for this Project are required to thoroughly familiarize themselves with specified products and installation procedures and submit to Architect any objections (in writing) not later than 10 days prior to Bid Date. Submittal of Bid constitutes acceptance of products and procedures specified.
18. Other responsibilities as indicated and as required.

B. Contractor's Use of Premises: As specified in Section 01 14 00, Work Restrictions, and Section 01 52 00, Construction Facilities.

1.06 EXISTING CONDITIONS

A. Contractor's start of work on site indicates that Contractor has reviewed Owner furnished surveys and reports, and existing conditions, and that these are an acceptable basis for making reasonable assumptions of actual site conditions.

B. Where existing conditions differ from that indicated by Contract Documents:
   1. Coordinate and distribute corrections prior to preparing Shop Drawings and before beginning work dependent upon accurate knowledge of conditions.
   2. Make corrections to Project Record Documents in accordance with Section 01 78 00, Closeout Submittals.

C. At Contractor's expense, immediately repair known existing conditions, including utilities, damaged during construction.

1.07 CONFLICTS AND OMISSIONS IN DRAWINGS AND SPECIFICATIONS

A. Where conflicts and omissions have not been brought to Owner's and Architect's attention, it is understood that provisions for the most stringent and/or expansive method or methods have been made.

1.08 OWNER'S OCCUPANCY AND USE OF THE PREMISES

A. Portions of the Park site will be occupied during construction, but Owner will make all areas indicated, accessible to the Contractor by the date of the Notice to Proceed.

B. There will be permanent facilities occupied and used by the public, adjacent to this Project. The Contractor shall coordinate construction staging and access to the Work to avoid disruption to activities.

C. Provide Owner's Representatives reasonable and safe access and escort as needed to maintain and inspect existing facilities.

1.09 OWNER-FURNISHED PRODUCTS

A. Owner Furnished, Contractor Installed (FOIC): Certain items, designated on the Drawings by the abbreviation “FOIC” means furnished by Owner, installed by Contractor. Items for installation by the Contractor will be furnished to the job site for consignment to the Contractor. Owner shall assume responsibility for delivery to project site in accordance with the construction schedule. Installation for Owner furnished items includes delivery to installation location, coordination with adjacent construction, and leaving items completely installed and satisfactory to Owner and Architect.
   1. FOIC Items:
      a. Toilet Room Accessories: Toilet paper dispensers, seat cover dispensers, sanitary napkin dispensers, sanitary napkin disposals, forced air hand dryers, and soap dispensers.

B. Owner Furnished, Owner Installed (FOIO) and Not In Contract (NIC): Certain items, designated on the Drawings by the abbreviations “FOIO” and “NIC” often require blocking, backing and accessory items necessary to complete the installations. This blocking, backing and accessory items for complete installations are requirements of this project as further defined below.
   1. FOIO Items:
      a. Toilet Room trash cans.

1.10 MISCELLANEOUS

A. Photographic Documentation: Provide photographs of construction progress as instructed by the Architect. Refer to Section 01 32 33, Photographic Documentation.

B. Items include, but are not limited to:
   1. Maintaining pedestrian and vehicular access to and around existing facilities.
   2. Not unreasonably encumbering site with materials or equipment.
   3. Not loading structure with weight endangering it.
   4. Repairing to original conditions damage to existing paving or adjacent buildings or improvements.
   5. Maintaining existing “accessible” (“ADA”) routes.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Expands on definitions and intent of language generally used in this Project Manual.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements
2. Section 01 31 13 - Project Communications and Coordination

1.02 INTENT AND LANGUAGE

A. The Project Manual is part of the Contract Documents between Owner and Contractor and is therefore written addressing the Contractor. Although references to subcontractors are made occasionally, it is not the intent of the Project Manual to divide the work into subcontracts; this is the responsibility of the Contractor.

B. The following information is provided to facilitate Project Manual comprehension, format, language, implications, conventions, and content. This information does not modify the substance of any requirements.
1. Project Manual is divided into Divisions and Sections for convenience. Division titles are not intended to fully describe the work of each Division or Section, and are not an integral part of the text specifying requirements.
2. Division and Section Numbers listed in Table of Contents, and items of work included in each Section, conform in general to the Construction Specifications Institute's Masterformat - Master List of Numbers and Titles for the Construction Industry," most recent edition. Numbering of Sections is merely for identification and may not be consecutive. Verify contents page by page to be sure book is complete in accordance with Table of Contents.
3. Except for Division 00 "Bidding Requirements, Contract Forms, and Conditions of the Contract" and certain Division 01 Sections, sections are usually subdivided into three "parts" for uniformity and convenience (Part 1 - General; Part 2 - Products; and Part 3 - Execution).
4. Section pages are numbered independently for each section. Section numbers and page numbers appear at top right and center bottom of each page of most sections.
5. Trade Associations and General Standard Abbreviations: Generally understood abbreviations may be used in text.
6. Architectural/Engineering Abbreviations: See Drawings.
7. 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:
   a. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on context, are implied where a colon (:) is used within a sentence or phrase.
   b. Specification requirements shall be performed by Contractor unless specifically stated otherwise.
8. Interpret singular words plurally and plural words singularly wherever applicable and full context of requirements implies.

C. Reference to Specifications Sections in Division 01: Where City of Mercer Island General Terms and Conditions provisions relate generally to work of Contractor and subcontractors as project administrative requirements, procedural requirements, temporary facilities, and the like, these provisions may be amplified by specifications sections in Division 01.

1.03 DEFINITIONS

A. "Accepted": When used to convey Architect's action on Contractor's submittals, applications and requests, the meaning of "accepted" is limited to Architect's duties and responsibilities as stated in the conditions of the Contract.

B. "Selected" means "as selected by Architect." It is not necessarily limited to manufacturer's standard line of colors, finishes or details, unless otherwise called for.

C. "Specified" means as written in the specifications.

D. "Directed" means a command or instruction by the Architect. Other terms including "requested", "authorized", "selected", "required", and "permitted", have the same meaning as "directed".

E. "Provide" means "pay for, furnish, and install complete, in place, ready for operation, and intended use."

F. "Furnish" means "supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and the like, as applicable in each instance.

G. "Verify" means "verify existing or new conditions and coordinate with Architect."

H. "Indicated" means requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documentations. Other terms including "shown", "noted", "scheduled", and "specified" have the same meaning as "indicated".

I. "Coordinate" means "coordinate scheduling, submittals, and work of the various Sections of specifications, drawings and work of subcontractors to assure efficient and orderly sequence of installation of interdependent construction elements."

J. "Architect:" The Architect, means CARDINAL ARCHITECTURE PC, 1326 5th Avenue Suite #440, Seattle, WA 98101.

K. "Consultant:" Where the term "Consultant" is used, it means consultant to the Architect or Owner as listed in the Project Manual.

L. "Engineer:" Where the term "Engineer" is used, sometimes in connection with a discipline such as "Mechanical Engineer," it means either:
   1. Consultant in his/her discipline to the Architect as listed in the Project Manual.
   2. Consultant to the Contractor, retained by Contractor to perform services required by construction activities.

M. "Specialist" means "an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field)." This individual or firm must be regularly engaged in and maintain a regular force of workers skilled in (as applicable): Manufacturing, fabricating, or otherwise performing required work.

N. "Contractor" and "Subcontractor": Where "You" in imperative mode is used or implied, Contractor is the one who shall perform or is responsible for the performance of others.
   1. The term "contractor" or "contractors" may be used, generally indicating any contractor, subcontractor, separate contractor, installer, consultant, or any other entity under contract with Owner to perform work on the Project Site.

O. "Installer" The entity (person or firm) engaged by the Contractor for the performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. Installers shall be specialists in operations they are engaged to perform.
   1. The term “experienced,” when used with the term “installer,” means having successfully completed a minimum of five previous projects similar in size and scope to this project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
   2. Trades: Using a term such as “carpentry” does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter.” It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
   3. Assigning Specialists: Certain Sections of the specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists shall be engaged for those activities, and their assignments are requirements over which the Contractor and subcontractors have no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor and subcontractors.
   4. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

P. “Manufacturer’s Instructions and Directions” and or “Install in Accordance with Manufacturer’s Instructions and Directions”:
   1. Throughout the documents, although it may not be specifically stated, install work in accordance with manufacturer's instructions and directions.
   2. Where Contractor is required to follow manufacturer’s instructions, directions and the like, but more than one manufacturer is involved in the work, or its component parts, follow all manufacturer’s instructions, directions and the like.

Q. The term “install” means entered permanently into project for intended use.
   1. Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable in each instance.

R. The term “reinstall” means entered permanently into project after temporary removal in the same manner as if the object to be reinstalled was new. See also, Section 01 35 91, Historic Treatment Procedures.

S. “Quantity:” Wherever in the contract documents an article, device or piece of equipment is referred to in the singular number, such reference shall include as many such items as are shown on the drawings or are required for a complete installation.

T. The term "demolish" means to tear down completely.

U. The term “remove” means taken away or moved from position occupied. See also, Section 01 35 91.

V. The term “salvage” means carefully remove to prevent damage to product, protect and store for future reinstallation on this or other projects. See also, Section 01 35 91.

W. The term “repair” means perform minor repair and patching of all materials per specifications whether indicated in the drawings or not. See also, Section 01 35 91, Historic Treatment Procedures.

X. The term “replace” means provide and install new material to match existing construction as indicated on the drawings. See also, Section 01 35 91.

Y. “Product” as used in these Contract Documents refers to materials, systems, and equipment provided by Contractor.

Z. The term “similar,” where it occurs in the Contract Documents, means that a portion of the Work shall have common features with, but may not necessarily be identical to, other related portions of the Work. Contractor shall correlate similar conditions of the work.

AA. The term "concealed" means spaces out of sight, for example, above ceilings, below floor, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.

BB. The term "exposed" means open to view, for example, pipe installed in a room and not covered by other construction.

CC. "Project Manual" as used in these Contract Documents includes Bidding and Contract Requirements, General Requirements, Specifications and other items that may be listed in the Table of Contents.

DD. “General” and “General Requirements:” These terms as used in Conditions of the Contract and this specification apply to the balance of Specification Divisions, Section of a Division, Article, or parts of a Section.

EE. “Regulations:” The term includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction (AHJ), as well as rules, conventions, and agreements within the construction industry that have control of the Work.

FF. “Project Site:” The space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built. Certain construction activity may extend beyond the project site.

GG. "Site:" The geographical location of the project.

HH. “Testing Agencies:” A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site, or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.04 MISCELLANEOUS EXPLANATIONS - INTENT

A. Intent of Drawings:
   1. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.
   2. Drawings are in part diagrammatic and do not necessarily show complete details of construction, work or materials, performance or installation. They do not necessarily show how construction details, other items or work, fixtures, and equipment may affect any particular installation. Ascertain and correlate the work to bring the parts together into a satisfactory and completed whole.
   3. Drawings do not show exact characteristics of the work, piping and air distribution configurations, or necessary number of fittings. The Drawings indicate only such details as are necessary to give a comprehensive ideal of the Work. In order to illustrate the Work, the Architect may furnish additional Drawings, explanations and

clarifications consistent with the original Drawings, purpose and intent of the Contract. Conform Work to such Drawings and explanations. The furnishing of such additional Drawings, explanations or clarifications is for the convenience of the Contractor and shall not entitle the Contractor to an increase in the Contract time or Contract Sum.

4. Furnish and install work not covered under any heading, Section, branch, class or trade of the Project Manual, but shown on or reasonably inferable from the Drawings. This includes work necessary to produce the intended results.
5. Do not scale drawings. Dimensional accuracy is not guaranteed, and field verification of dimensions, locations, and levels to suit field conditions is required.

B. Intent and Use of Project Manual and Specifications:
   1. See also, Article 1.02 above.
   2. Divisions and sections of these specifications conform generally to customary trade practice.
      a. They are intended for convenience only.
      b. The Architect is not bound to define the limits of any subcontract.
      c. The General Conditions and Division 01, General Requirements, of these specifications shall be a part of technical divisions and sections the same as if they were specifically called for in each section.
   3. Wording of these Specifications: These Specifications are of the abbreviated or streamlined type and may include incomplete sentences. They are in most parts written in imperative mode and are addressing the Contractor. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.
   4. Number of Specified Items Required: Wherever in these Specifications an article, device or piece of equipment is referred to in the singular number, the reference applies to as many such articles as are shown on the Drawings or required to complete the installation.
   5. Tense, Gender, Singular, Plural: Present tense words include future tense. Words in masculine gender include feminine and neuter genders. Words in the singular include plural. Plural words include singular.
   6. Specification by Reference: Materials and products specified by reference or number, symbol or title of a specified standard, such as commercial standard, ANSI and ASTM documents, Federal Specifications, trade association standard, or the like, shall comply with the following:
      a. The latest revision requirements thereof with amendments or supplements thereto in effect on date of Project Manual, except as modified;
      b. When building code requirements refer to a different issue of standards specifications, such issue governs; and:
      c. Listing of certain reference standards: Refer to Section 01 42 00, Reference Standards.

C. First Class Workmanship is expected.
   1. Prior to installing an item or material, verify that receiving surfaces are plumb, level, true to line, and straight to the degree necessary to achieve tolerances specified or required. Perform without extra cost shimming, blocking, grinding, or patching required to make such surfaces plumb, level, true to line and straight.
   2. Take care in attention to details and fitting at intersections and junctures of materials. Joints shall be tight, straight, even, and smooth.

D. Fastening and Connections: Furnish fastenings and connections necessary and adequate to assemble work whether indicated or not. Provide: Proper assemblage for intended performance of components and assemblies; bonds shall bond properly, fastening shall fasten properly; operable items shall operate smooth, without sticking or binding, and without “play” or looseness; and the like.

E. Presence of Architect or Owner: Do not misconstrue presence of Architect, Owner or any of their Representatives at the site as assuring compliance with Contract Documents.

1.05 GENERAL INSTALLATION PROVISIONS

A. General Installation Provisions: Provide items, articles, materials, and operations listed, including labor, materials, equipment and incidentals required for their completion. See Section 01 61 00, Basic Product Requirements for requirements for installer's inspection of conditions, inspection of items to be installed, and attachment and connections.

B. Measurements: Check measurements and dimensions of the work, as an integral step of starting each installation.

C. Dimensions and Measurements on Drawings:
1. Dimensions govern.
2. Do not scale.
3. Check dimensions in the field and verify them with respect to adjacent or incorporated work. Large scale drawings take precedence over smaller scale drawings, plans, elevations, and cross sections.
   a. Information concerning existing conditions was considered suitable for preparation of the Drawings and is given for Contractor's *convenience*. Architect and Owner do not guarantee accuracy of such conditions.
4. See also, Section 01 31 13, Project Communications and Coordination.

D. Weather Conditions:
1. Install each unit of work during weather conditions and project status which will ensure the best possible results in coordination with the entire work.
2. Isolate each unit of finished work and protect as necessary to prevent deterioration.

E. Inspection and Tests: Coordinate enclosure of the work with required inspections and tests, so as to minimize the necessity of uncovering work for that purpose.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Hours of work.
2. Use of premises.
3. Work sequence.
4. Miscellaneous requirements.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements
2. Section 01 11 00 - Summary of Work
3. Section 01 32 16 - Construction Schedules
4. Section 01 52 00 - Construction Facilities
5. Section 01 56 00 - Temporary Barriers and Enclosures

1.02 HOURS OF WORK

A. Work hours shall conform with requirements of Authorities Having Jurisdiction including the City of Mercer Island's limitations and noise restrictions.

B. Normal Working Hours: Contractor shall have use of the premises between the hours of 7:00 am and 6:00 pm Monday through Friday, and 9:00 am and 6:00 pm on Saturdays. No work may be performed on Sundays or Holidays. See MICC 8.24.020.
1. Other times of work shall be proposed a minimum of 5 days in advance to the Owner for consideration.

C. Any overtime required to complete this Project outside the Contractor’s defined normal working hours shall be included as a part of this contract. No additional payments will be authorized for work performed on weekends, holidays, time required to attend meetings outside the Contractor’s normal working hours, or time outside the Contractor’s normal working hours required to communicate any identified issues from a previous work shift.

1.03 CONTRACTOR’S USE OF PREMISES

A. Contractor shall have use of the premises as indicated in Contract Documents, for execution of the Work during the contract time.
1. Coordinate use of premises under direction of Architect and Owner.
a. In particular, note restrictions and requirements by adjacent property occupants for noisy operations.
2. Limits: Confine construction operations to area within the "limit of construction" line indicated, except where specific incidental work is required beyond this boundary. Coordinate with Owner. Notify the Owner as soon as possible but not less than 72 hours before proceeding with this incidental work and agree on access, plant protection and public safety procedures.
a. Do not disturb portions of site beyond areas in which the Work is indicated.
b. Owner Occupancy: Allow for Owner occupancy of site as required.
3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
a. Schedule deliveries to minimize use of driveways and entrances.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

B. Construction Staging Area: Coordinate use of site during construction with the Architect and Owner prior to utilization of area. Modify or change as required for schedule. Coordinate staging areas with subcontractors and material suppliers.

C. Vehicular Access and Parking: As specified in Section 01 52 00, Construction Facilities.

D. Provide barriers and security as required by Contractor and subcontractors.

E. The building site is within the city limits of Mercer Island, Washington. Comply with the regulations and requirements of the City of Mercer Island, and Authorities Having Jurisdiction.

F. Owner Occupancy and Existing Buildings in Site Vicinity:
   1. Protect existing buildings and site development adjacent to the Work from deterioration due to construction operations. Repair damage caused by construction operations.

1.04 WORK SEQUENCE

A. Sequencing: Use any sequence of operations compatible with monthly Progress Schedule, in accordance with Section 01 32 16, Construction Schedules.
   1. These documents shall not be interpreted implicitly or explicitly as definition of procedure and sequence of operations.
   2. Order as to procedure and sequence of operations are Contractors options, consistent with contract documents and as approved by Architect and Owner.

1.05 MISCELLANEOUS REQUIREMENTS

A. No-Smoking Policy: Smoking is not permitted within the building or within 25 feet of the entrances, operable windows, or outdoor air intakes. Post “No Smoking” signs during construction.

B. Owner’s Occupancy Requirements: See Section 01 11 00, Summary of Work.

C. Storage: Assume full responsibility for the protection and safekeeping of products and equipment under this Contract, stored on the Project Site. See also, Section 01 52 00, Construction Facilities.
   1. At no cost to Owner, move any stored products under Contractor’s control, which interfere with operations of the Owner or other contractors.
   2. Obtain and pay for the use of additional storage or work areas on or off Project Site as needed for operations.
   3. Do not allow storage of flammable liquid or hazardous materials in any portion of the building including mechanical or electrical equipment rooms.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Substitution procedures during Bid/Negotiation period.
2. After the Start of Construction, the Owner and Architect may, at their option, consider Substitution Requests, as described herein.

1.02 GENERAL

A. Furnish and install products specified, under options and conditions for substitutions stated in this Section. Do not substitute products unless a substitution request has been approved by Architect.

B. After award of contract, submit written requests providing proposed changes to the Contract Sum for such substitution within 30 days after Notice to Proceed (NTP).
1. Consideration of Substitution requests will be made as indicated in Article 2.03.
2. Substitutions will not be considered if:
a. They are indicated or implied by way of Shop Drawings or other Project data submittals, without proper notice shown on attached form;
b. They are requested directly by a subcontractor or supplier;
c. Acceptance will require revisions of Contract Documents.

C. The Architect's decision as to the quality of the materials will be final.

D. If deemed necessary by the Architect or Owner, the Contractor shall, at his/her own expense, have tests made to prove the equality of the products proposed as substitutions.

E. The cost of any redesign caused by a substitution shall be borne by the Contractor.

1.03 SUBMITTALS

A. See Section 01 33 10, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data and Samples, for general submittal requirements.

B. Submit electronic copies of Substitution Request forms with attachments within time frames indicated in this Section.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

A. The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, or indicates "no equals", "no substitutions", or "no exceptions", provide the product indicated. Notify Architect if it is discovered that the named product does not comply with the contract documents, or is not appropriate for the function intended.
2. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, or indicates "no equals", "no substitutions", or "no exceptions", provide one of the products indicated. Notify Architect if it is discovered that none of the named products complies with the Contract Documents, or is not appropriate for the function intended.

3. Nonproprietary Specification Requirements: Where the Specifications list products or manufacturers, or indicate “or approved,” “or approved equal” or “other acceptable”, comply with Contract Document provisions concerning product substitution to obtain approval for use of another product.
4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. Submit manufacturer's recommendations contained in published product literature or by the manufacturer's certification of performance for approval by Architect.
6. “Basis of Design”: Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics including performance, based on product named. Provide the specified named product or submit a comparable product by other manufacturer (from manufacturers listed, where indicated) meeting or exceeding the Basis of Design qualities and characteristics.
7. Visual Matching: Where matching an established sample is required, the Architect’s decision will be final on whether a proposed product matches satisfactorily.
    a. Where there is no product available within the specified category which matches satisfactorily and also complies with other specified requirements, comply with the provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
8. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures .." or similar phrases, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

2.02 COMPARABLE PRODUCTS

A. Conditions for Consideration: Owner and Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, the requests may be returned without action, except to record noncompliance with these requirements:
    1. Evidence that the proposed product does not require 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 including but not limited to those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    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 Owners and Architects, if requested.
    5. Samples, if requested.

2.03 PRODUCT SUBSTITUTION

A. General Provisions:
    1. The requirements for substitutions do not apply to specified subcontractor options on products and construction methods. Revisions to Contract Documents, where requested by Owner or Architect, are "changes" not "substitutions".
    2. Subcontractor's determination of, and compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders, except as provided for in Contract Documents.

Otherwise, the subcontractor's requests for changes in products, materials and methods of construction required by Contract Documents are considered requests for "substitution," and are subject to requirements hereof.

3. If a bidder or contractor desires approval of some material or product other than that specified, they shall submit a written request for approval of the substitute item in accordance with the following requirements:
   a. Such requests shall be made on the Substitution Request Form at end of this Section. Where specifications specify a product color and/or pattern, include a sample of proposed product/item at a size appropriate to make an evaluation with the specified product.
   b. No request for approval will be considered unless submitted in accordance with this Section.
   c. Final decision as to whether an item is an equal or satisfactory substitution rests with Owner.
4. Substitution Requests: In accordance with the Substitution Request form and following:
   a. The substitute material or product shall be accompanied by its reference in the Contract Documents and complete catalog, technical and other information.
   b. If applicable, include samples showing comparison of physical and other pertinent characteristics as required to establish equivalence of acceptability for the proposed application.
   c. Where specific test results are required by the Contract Documents, the comparison data for the proposed item shall be based upon the same test methods as those specified, or they shall be correlated to clearly demonstrate comparability.
   d. The same guarantee/warranty described for the specified product shall be required for the substitution.

B. Substitution Requests are NOT required under the following conditions:
   1. For products specified only by reference standards, the Contractor may select any product meeting the reference standards, by any manufacturer without a Substitution Request.
   2. For products specified by naming several manufacturers' products, the Contractor may select and utilize one of the named products without a Substitution Request.

C. Substitution Requests Prior to Bid Opening: Submit written substitution requests (on form provided) to Architect.
   1. Submittals received that are incomplete or on incorrect form may be rejected.
   2. Time/submitted in order to be received in Architect's office: Not later than 10 business days prior to bid opening. Request received after this date will not be considered.
   3. Bidders will be informed by addendum of additional materials and products approved for use. No other form of approval will be given during the bid period and bidders shall not rely upon any approval not incorporated into the Contract Documents in this manner.

D. Substitutions – After Starting Work: After Contract Award, substitution requests for approval of substitute materials or products for items indicated as proprietary, semi-proprietary or "approved" equal will not be considered, unless one or more of the following conditions exists. With each Substitution request, indicate which condition applies.
   1. Unavailability: A substitution is required because the specified item is not available, due to factors beyond the control of Contractor.
      a. Notify Architect in writing as soon as non-availability becomes apparent.
      b. Unavailability due to late order is not cause for substitution requests.
   2. Unsuitability: Subsequent information or changes disclose inability of the specified item to perform as intended.

3. Regulatory Requirements: Final interpretation of Code, regulatory requirements, safety requirements, or insurance requirements necessitate a change due to inability of the specified item to conform.
4. Warranty: Manufacturer or fabricator cannot certify or warrant performance of specified item as required.
5. Owner's Benefit: In the judgment of the Contractor, acceptance of the proposed substitution is clearly in Owner's best interest because of cost, quality, or other consideration. In requesting a substitution under this clause, furnish substantiation of any such reason, including costs where applicable. The Architect will judge applicability and “best interest” of the Owner, and the decision shall be final.
6. Allow not less than 15 days for Architect's consideration of product substitution in addition to time required for submittal review in accordance with Section 01 33 10, Submittal Procedures.

E. In making request for approval of substitute materials, the Bidder/Contractor represents:
1. That they have investigated the proposed product and, in their opinion, it is equal or superior in all respects to that specified.
2. That the substitutions meet space requirements, AND that alterations to connecting items, products and work that are necessitated by use of the alternate items shall be properly made, at no additional cost to the Owner and Project.
3. That they shall coordinate all trades including changes thereto as may be required.
4. That they shall waive all claims for additional costs which subsequently become apparent as a consequence of the substitution, and bear all costs related hereto, including costs of Architect's services for redesign, if deemed necessary.

F. After the award of contract, substitutions will not be considered if they are indicated or implied on Shop Drawings or other project data submittals, without proper notice shown on the Substitution Request Form at the end of this Section.
1. Submissions received that include products or manufacturers not listed in the specifications or approved on the form during the bid period will be returned and marked “Revise and Resubmit”.
2. Any item or material not specified or approved which is used in the Work is at the Contractor’s own risk and the Architect is authorized to order it removed and replaced by the specified item or material without challenge from the Contractor and without additional cost to the Owner.

G. Action by Architect:
1. During Bidding Period: If the Architect approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.
2. After Start of Work: Submit requests for substitutions within first 30 days after NTP.
    a. Within 7 days of receipt of Contractor's request for substitution, Architect will request whatever additional information or documentation may be needed for their evaluation of the request.
    b. Within 14 days of receipt of request, or within 7 days of receipt of requested additional information or documentation (whichever is later), Architect will notify the Contractor of either acceptance or rejection of the proposed substitution.
    c. Rejection will be the endorsement on the form provided by Contractor and will include statement of the reasons for rejection (non-compliance with the requirements for requested substitutions, or other reasons as detailed).
    d. Acceptance will be the endorsement on the form provided the Contractor.

PART 3 - EXECUTION

Not Used.

END OF SECTION

Substitution Form follows this Section.

SUBSTITUTION REQUEST FORM

TO: CARDINAL ARCHITECTURE PC
1326 5th Avenue, Suite 440, Seattle, WA 98101

PROJECT NAME: Luther Burbank Park Boiler Building Phase LBB1, Mercer Island, Washington

CONTRACTOR: _____

We hereby submit for consideration, the following product instead of specified product for above project:

SECTION _____ PARAGRAPH _____ SPECIFIED ITEM _____

Proposed Substitution: _____

Installer/Contact Information: _____

Reason for not providing specified item (see 01 25 00-2.03-D): _____

Differences between proposed substitution and specified item: _____

Product History: ❑ New Product ❑ 1-4 years old ❑ 5-10 years old ❑ More than 10 years old

COST AND TIME IMPACT

Cost Impact: _____

Savings to Owner for accepting substitution: _____

Proposed substitution changes Contract Time: ❑No ❑Yes [Add] [Deduct] _____days.

DOCUMENTATION: Refer to Sections 01 25 00, 01 33 10, and 01 33 23 for additional requirements.

Submit with request, necessary substantiating data and samples to prove equal quality, performance, and appearance, to that specified. Clearly mark specifications and manufacturer's literature with point-by-point comparison. Indicate differences in quality of materials, dimensions and construction. Include changes to Drawings which proposed substitution will require for its proper installation.
Attached:
❑ Specification Section indicating point-by-point comparison. REQUIRED.
❑ Product data/technical data including SDS:
❑ Reports including laboratory test reports:
❑ Cost data:
❑ Samples:
❑ Drawings:

Fill in Blanks Below:

A. Does the substitution affect the Drawings or specifications?: ❑No ❑Yes
If yes, clearly indicate changes: _____

B. What affect does substitution have on applicable code requirements?: _____

C. Manufacturer's warranty for the proposed and specified items are:
❑Same ❑Different (explain) _____

D. What affect does substitution have on other trades, on other Contracts or on Work by Owner?:

E. List of names and addresses of 3 similar projects on which product was used, date of installation, and Owner and Architect's name and address:

1. _____

2. _____

3. _____

CERTIFICATION OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

The Undersigned attests that the proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified items and waives the right to additional payment or time necessary because of failure of proposed substitution to produce indicated results.

The Undersigned agrees to pay for changes to the building design and Architect's review time, including engineering and detailing costs caused by the requested substitution, if deemed necessary by Owner.

Signature must be by person having authority to legally bind his/her firm to the above terms. Failure to provide legally binding signature will result in retraction of acceptance.

Submitted By:

_____	_____
Signature	Title
_____	
Printed Name	
	City, State, Zip
_____	_____
Firm	Address
_____	_____
Date	Telephone

FOR USE BY ARCHITECT:

- ❑ Accepted – Make submittals in accordance with Section 01 25 00.
- ❑ Accepted as Noted – Make submittals in accordance with Section 01 25 00.
- ❑ Not Accepted– Use specified materials.
- ❑ Substitution Request Received Too Late – Use specified materials.

By _____ Date _____

Remarks:

END OF FORM

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Administrative and procedural requirements for handling and processing contract modifications.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements
2. Section 01 25 00 - Substitutions and Product Options
3. Section 01 29 10 - Applications for Payment
4. Section 01 32 16 - Construction Schedules
5. Section 01 78 00 - Closeout Submittals: project record documents

1.02 ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS (ASI)

A. Minor Changes In The Work: The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on a form prepared by the Architect (AIA Document G710, or other agreed upon form).
1. If Contractor believes a cost is associated with the supplemental instructions, provide written notice to the Architect within 10 calendar days of receipt of the instructions.
a. Failure to submit such a notice within stated time shall indicate the Contractor's verification that instructions will not affect Contract Sum or Contract Time.
2. If deemed appropriate, a Proposal Request (PR) will be issued by the Architect.

1.03 CHANGES IN THE WORK

A. Changes to the Work can be by:
1. Request for Change Proposal (RFP) issued by the Architect to the Contractor on the Owner's behalf.
2. Construction Change Directive (CCD) issued by the Architect to the Contractor on the Owner's behalf.

B. Owner-Initiated Change - Request for Proposal (RFP): Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Also referred to as a "Change Proposal".
1. Architect will issue a number for Proposal Requests. Proposal Requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
2. Within 10 calendar days of receipt of a proposal request, or sooner if the project schedule necessitates, submit an estimate of cost and time necessary to execute the change to the Architect for the Owner's review. Include the following:
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. Applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Costs of labor and supervision directly attributable to the change.
d. 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.
e. See also, 1.03 D. below.

C. Contractor-Initiated Change Request (CR): When latent, unforeseen, or other conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect. Also referred to as a "Request for Change Order".
   1. Contractor shall issue a number for Change Requests.
   2. Contractor shall provide documentation describing the proposed change, within 10 calendar days of occurrence of the event giving rise to the request. Include following:
      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.
      b. 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.
      c. Applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      d. Costs of labor and supervision directly attributable to the change.
      e. 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.
      f. Comply with requirements in Section 01 25 00, Substitutions and Product Options, if the proposed change requires substitution of one product or system for product or system specified.
      g. See also, 1.03 D. below.

D. Detailed Documentation of Owner-Initiated or Contractor-Initiated Changes:
   1. Support each lump sum proposal quotation, and each unit price (not previously established) with sufficient substantiating data.
   2. On request, provide additional data to support time and cost computations:
      a. Labor required.
      b. Equipment required.
      c. Products required:
         1) Recommended source of purchase and unit cost.
         2) Quantities required.
      d. Taxes, insurance, and bonds.
      e. Documented credit for work deleted from Contract.
      f. Overhead and profit.
      g. Justification for any change in Contract Time.
   3. Support each proposal for additional costs, and time-and-material/force account work with documentation, as required for lump-sum proposal. Include additional information:
      a. Name of Architect or Owner's representative who ordered work, and date of order.
      b. Dates and times work was performed, and by whom.
      c. Time record, summary of hours worked, and hourly rates paid.
      d. Receipts and invoices for:
         1) Equipment used, listing dates and times of use.
         2) Products used and listing of quantities.
         3) Subcontracts.
   4. Document Requests for Substitutions. Comply with requirements in Section 01 25 00, Substitutions and Product Options, if the proposed change requires substitution of one product or system for product or system specified.
   5. Statement as to whether overtime work is, or is not, authorized.

E. Approval or Rejection of Change Request:
   1. When change is initiated by Architect or Owner through a RFP:

a. Submit in writing Contractor's detailed proposal. Quotation shall be guaranteed for period specified in Proposal Request beginning from signing of proposal. If no period specified, guarantee quotation for 60 days from signing.
b. Architect will review the proposal and respond in writing by one of the following:
    1) Requesting additional information.
    2) Incorporating into a Change Order.
        a) Approved PR's may be individually processed, or grouped into a single Change Order.
    3) Rejecting.
c. Do not proceed with work until a signed Change Order is received from the Owner.

2. When change is initiated by Contractor through a CR:
    a. Architect reviews and responds in writing by one of the following:
        1) Agrees with Contractor's change proposal;
        2) Requesting additional information;
        3) Rejecting.
    b. If the Architect responds by agreeing to the Contractor's change proposal, a Change Order will be processed.
    c. If additional information is requested by Architect, respond in writing within 7 days of Architect's request.
    d. Do not proceed with work until signed Change Order is received from Owner.
3. Architect will review and respond within 7 calendar days of receipt of notice.

1.04 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive (CCD): The Architect may issue, on behalf of the Owner, a CCD instructing the Contractor to proceed with a change or specific portion of the change in the Work or specific portion of a PR, for subsequent inclusion in a Change Order.
    1. The CCD will contain a complete description of the change in the Work. It will also designate the method to be followed to determine change in the Contract Sum or Contract Time.
    2. Do not proceed with work until the CCD is signed by Contractor, Architect and Owner.
    3. As the Work progresses, monitor its costs.
    4. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
        a. Include daily accounting of time spent by each person working specifically on such work, signed by Owner, together with copies of all related purchase orders.

1.05 CHANGE ORDER PROCEDURES

A. Change Orders: See City of Mercer Island Section 00 72 00 General Conditions Article 6, Time and Price Adjustments. Upon final agreement of costs and/or time on either a RFP, CR, or CCD, a Change Order will be processed by Architect (on agreed upon form).
    1. Do not submit an invoice for Work changes until a fully executed Change Order is completed.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Administrative and procedural requirements governing the Contractor's Applications for Payment.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements
2. Section 01 26 00 - Contract Modification Procedures
3. Section 01 32 16 - Construction Schedules
4. Section 01 74 19 - Construction Waste Management: submittal of waste summary
5. Section 01 77 00 - Closeout Procedures
6. Section 01 78 00 - Closeout Submittals

1.02 SCHEDULE OF VALUES

A. Submit a list of all Subcontractors and Material Suppliers, and a copy of each Subcontractor's and Material Supplier's contract with the General Contractor.

B. The Schedule of Values and the Contractor's Construction Schedule shall be developed and agreed to in conjunction with the subcontractors.
1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
a. Contractor's Construction Schedule.
b. Application for Payment forms, including Continuation Sheets.
c. List of subcontractors.
d. Schedule of allowances.
e. Schedule of alternates.
f. List of products.
g. List of principal suppliers and fabricators.
h. Schedule of submittals.
2. Submit the Schedule of Values to the Architect for approval at the earliest possible date but no later than 14 days after the issuance of the Notice to Proceed, and not less then 7 days prior to the first application for payment.

C. Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each listed Specification Section beginning with Division 02, relating directly to the pertinent applicable activities of the Progress Schedule, with each line item broken down separately for labor and materials. Include the following as a minimum:
1. Include separate line item values for construction progress schedule and updates, mobilization, permits/bonds/insurances, temporary facilities, supervision, survey and layout, demobilization, and equipment/systems start-up, and project closeout retainage.
a. General Conditions and Mobilization shall not exceed 3% of Contract amount.
b. Demobilization shall be not less than 1 percent of the Contract amount.
c. Project closeout retainage value, for duration between Substantial Completion and Final Acceptance, shall be not less than 2% of Contract amount. Of that amount, 1 percent shall be for "Punchlist Work". This amount will not be released until Final Completion is reached.
1) This closeout retainage shall be in addition to the 5% retainage withheld per RCW 60.28, and shall be for the purpose of protection of the Owner in the completion of any outstanding items on the Final Acceptance Punch

List, and for reimbursing the Architect and their consultants for additional 'punch list' re-inspections beyond the first re-inspection; refer to Section 01 77 00, Closeout Procedures.

d. Schedule preparation and updates shall not be less than 0.5% of Contract amount.

2. Major cost items, which are not directly a cost of actual work-in-place, such as distinct temporary facilities, may be either shown as items in the Schedule of Values or included in General Conditions and Mobilization or Demobilization at the Contractor's option.
3. Line item amounts shall be rounded off to nearest whole dollar, with total of the primary schedule of values breakdown equal to the Contract Sum.
4. Provide at least one line item for each Specification Section, and at least one line item for each pertinent item within each specification section.
5. Break down items of work that include both labor and material into those respective components.
6. 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 requirements for insurance and bonded warehousing.
   b. Include separate line item cost for shop drawing preparation.
7. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

D. Identification: Include the following Project identification on the Schedule of Values:
   1. Project name and location.
   2. Name of Architect.
   3. Project Number.
   4. Contractor's name and address.
   5. Date of submittal.

E. Listing: Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
   1. Related Specification Section.
   2. Description of Work.
   3. Name of subcontractor.
   4. Name of manufacturer or fabricator.
   5. Name of supplier.
   6. Change Order (numbers) that affect value.
   7. Dollar value.
   8. Percentage of Contract Sum to nearest 1/100 percent, adjusted to total 100 percent.

F. Schedule of Values Updating: Update and resubmit Schedule of Values prior to the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum. Add a new line item for each Change Order, and provide a breakdown of several line items for large or complicated Change Orders.

1.03 APPLICATIONS FOR PAYMENT

A. General:
   1. Submit itemized payment request as required in Division 00, including Section 00 72 00 General Terms and Conditions together with Schedule of Values and other submittals indicated or listed herein.

2. Except as otherwise indicated, sequence of progress payments is to be regular, and each must be consistent with previous applications and payments; it is recognized that certain applications involve extra requirements, including initial application, application at times of Substantial Completion, and final payment application.
3. Do not "project" work completed beyond the date of Application for Payment submittal for the purpose of payment request.
4. Include Summary of Waste Generated by Project as further described in Section 01 74 19, Construction Waste Management.

B. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
1. If the Contractor withholds any portion of a previous payment from a subcontractor or material supplier, other than normal retainage, provide a letter to the Architect with the next Application for Payment stating the reasons for withholding the payment.

C. Payment Application Times: Progress payments will be based upon a monthly period. The Owner will make new payments each month on date agreed by Owner. Submit draft applications for payment a minimum of 10 days prior.

D. Draft Payment Application: Submit electronic copies to Architect and Owner 10 business days before the date established for each application, or at least 48 hours prior to the last regular construction meeting of the month at which the payment request will be reviewed. The draft payment request shall be a copy of the previous month's approved payment request, with proposed percentages and dollar amounts (rounded off to nearest whole dollar) hand written beside each line item, and a total percentage complete and dollar amount for the month. Once the amounts are reviewed and agreed to by the Architect and Owner, the Contractor shall prepare the actual payment request as required in this section based upon the amounts agreed to.
1. Have available for Architect review current Project Record Documents delineating any and all revisions since the previous application for payment.

E. Application Preparation: Complete every entry on the actual payment request form. The Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application. If a Change Order includes more than one Proposal Request or Construction Change Directive, list each individually.

F. Transmittal: Submit original signed copies of each Application for Payment to the Architect by a method ensuring receipt within 48 hours.
1. Transmit with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.

G. Initial Payment Application: The principal administrative actions and submittals which must precede or coincide with submittal of first payment application can be summarized as follows, but not necessarily by way of limitation:
1. Submit Statement of Intent to Pay Prevailing Wages on Public Works Contract on form issued by the State of Washington, Department of Labor and Industries. One is required from the Contractor and one from each of those subcontractors who will provide labor on the project site.
    a. When these forms have been filled in, the Contractor shall send them to the Industrial Statistician in Olympia for certification. After certification, three copies will be returned to the Contractor. He shall forward the Owner's copy directly to the Owner (do not send through the Architect). The Contractor shall also post on the Project site one certified copy of each Statement of Intent.

b. Processing of an application will not begin until an approved copy is on file with the Owner for each classification of laborers, workers, or mechanics employed by the Contractor or Subcontractor that are included in an application for payment; no exceptions.

2. Submit and receive review comments for construction progress schedule.
3. Submit schedule of values, allocated to the various portions of the work; the schedule shall be used as a basis for the Contractor's Application for Payment.
4. List of Subcontractors, complete with phone numbers, business address and contact person.
5. List of major material suppliers and fabricators, complete with phone numbers, business address and contact person.
6. Contractor's Progress Schedule (preliminary if not final).
7. Schedule of Submittals (preliminary if not final).
8. Listing of Contractor's staff assignments and principal consultants.
9. Copies of acquired building permits and similar authorizations and licenses from governing authorities for current performance of the work.
10. Initial progress report.
11. Initial settlement survey and damage report, if required.
12. Quality Control Plan.
13. Safety Plan.
14. Waste Management Plan.
15. List of emergency contact information.
16. Other documents as may be required in the Contract Documents.

H. Applications each Month During Construction:
1. Submit itemized application, in number of copies as specified herein, each with waivers of mechanics liens from principal subcontractors, sub-subcontractors and suppliers as specified below.
2. Applications are to be signed by a responsible officer of Contracting firm. Do not sign in black ink.
3. Application for Payment shall include the following:
   a. Application and Certificate for Payment on Contract.
   b. Updated Project Schedule.
   c. Statement of Apprenticeship and Journeymen Participation.
   d. State of Washington Invoice Voucher.
   e. Invoice Voucher - Escrow.
   f. Certificate for Material Stored on Job Site.
   g. Invoices for materials and equipment stored off site, as allowed.
   h. Updated Construction and Submittal Schedules: If substantial changes have occurred in the Project Construction Schedule, or if enough changes have occurred that the schedule is rendered inaccurate or ineffective, submit with Application for Payment a revised updated Construction Schedule for evaluation and measurement of actual work-in-place with said application for payment, together with updated submittal schedule. If the Contractor does not submit a revised schedule with a payment request it is agreed by the Contractor that the project is still on schedule according to the last submitted schedule.
      1) In addition, should actual work completed be more than 14 days behind schedule, submit a recovery schedule per requirements of Section 01 32 16, Construction Schedules.
   i. Updated CWM progress reports.
4. When Architect finds Application for Payment properly completed and correct, the Architect will sign and transmit all copies of Application for Payment to Owner for processing.
5. If Architect or Owner finds Application for Payment improperly or incorrectly executed, an annotated copy will be returned for a NEW SUBMITTAL.
6. Only minor corrections are allowed, with approval of Owner.

I. Application at Time of Substantial Completion: See Section 01 77 00, Closeout Procedures, for principal administrative actions and submittals which must precede or coincide with such special applications.

1.04 PAYMENT FOR STORED MATERIAL

A. If authorized by the Owner, the Application for Payment may include request for payment for material delivered to the Project Site and suitably stored. Payment may be requested for material stored off-site, provided the Contractor complies with or furnishes evidence of the following:
   1. Material shall be placed in a bonded warehouse within 10 miles of the project, that is structurally sound, dry, lighted and suitable for materials to be stored;
   2. Materials for the Project stored in the warehouse shall be continuously under lock and key, and only Contractor's authorized personnel shall have access;
   3. Owner shall have the right of access, in the company of the Contractor, at all times;
   4. Contractor furnishes a certified list of materials stored, bills of lading, invoices and other information as may be required, and shall furnish to the Owner notice when materials are moved from storage to the Project site;
   5. Contractor furnishes the Owner a certificate of insurance extending the Contractor's insurance coverage for damage, fire and theft to cover the full value of all materials stored or in transit; and
   6. Contractor and its surety shall assume total responsibility for the stored materials.

1.05 SUBSTANTIATING DATA

A. When Architect requires substantiating information, submit data in a timely manner justifying line item amounts in question.

1.06 APPLICATION FOR FINAL PAYMENT

A. Application for a FINAL pay request will be accepted for processing only after satisfactory completion of the following:
   1. Punchlist items complete and accepted;
   2. Agreement on all Change Order costs;
   3. Required permits signed off;
   4. Submittal of Record Documents (as-builts);
   5. Submittal of O&M Manuals;
   6. Submittal or Warranty Manuals;
   7. All training has been provided to Owner designated staff and signed rosters submitted to the Owner.
   8. All security badges and keys have been returned.
   9. Other requirements as specified in Section 01 77 00, Closeout Procedures.

1.07 RELEASE OF RETAINAGE

A. Pursuant to the completion of Work performed in accordance with City of Mercer Island Division 00 including Public Works Contract, and Final Acceptance by the Owner, the following requirements must be satisfied to allow the release of retained contract funds at the earliest possible date.
   1. All Contract Closeout items have been reviewed by the Architect, any corrections made by the Contractor, and final copies received by the Owner.
   2. The Architect maintains a Construction Completion Checklist of requirements for completing the project. When the Architect determines that the checklist has been completed, the Architect consults with Owner for concurrence that all requirements have been met for establishing Final Completion.

3. If there are no outstanding items required of the Contractor on the Construction Completion Checklist, the Architect provides a letter to the Owner with a copy to the Contractor that to the best of its knowledge, information, and belief, the Contractor has reached Final Completion on the project in conformance with the Contract Documents.
4. The Architect sends the Owner its Notification of Project Completion for the Owner's signature and return to the Architect.
5. Upon receipt of the signed Notification of Project Completion, the Architect issues its Completion Notice.
6. Contractor submits final Affidavit of Wages Paid, to the Department of Labor and Industries.
7. The Owner sends the Department of Revenue its Notice of Completion of Public Works Contract and sends the Contractor written notice of Final Acceptance.
8. Certificate of Payment of State Excise Taxes by Public Works Contractor: Following receipt of Owner's notice of completion and after determining that all taxes, increase and penalties due from Contractor have been paid, the Department of Revenue will issue this certificate to the Owner, releasing the state's lien on the retained percentage.
9. Certificate of Payment of Contributions, Penalties and Interest on Public Works Contract: Upon receiving a copy of the Owner's notice of completion from the Department of Revenue and determining that the Contractor is in compliance with the provisions of the Employment Security Act, the Employment Security Department will issue this certificate to the Owner, releasing its lien on the retained percentage.
10. Request for Release. This form shall be completed by the Contractor and mailed to the Department of Labor and Industries, Industrial Insurance division, Contract Release Section, Olympia, Washington 98504. One copy of the Contractor's request for release, including attached list of subcontractors, shall be transmitted to Owner.
11. Certificate of Release: Upon receipt of Contractor's request for release and verification from its records that the industrial insurance and medical aid premiums have been paid by Contractor and each Subcontractor, the Department of Labor and Industries will issue a statement to that effect, releasing Owner from further liability.
    a.
12. At the time Architect sends the Contractor written notice of Final Acceptance, it advertises the acceptance of the project which begins the 45 day period for liens to be filed.
13. At the end of the 45 day period, if all three letters of release have been received, and there are no liens filed that have not been released, the retainage will be released.
    a. If the retainage was placed in an escrow account, Owner will notify the escrow company that the retainage may be released. No invoice billing from the Contractor for the retainage is required.
    b. If the Contractor has elected to not put the retainage in escrow, an invoice for the retainage amount must be submitted and processed to allow release of the retained money.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Administrative procedures and formats for:
      a. Communications.
      b. Requests for Information.
      c. Coordination of the Work of the Contract.

B. Related Sections:
   1. Division 00 - Procurement and Contracting Requirements

1.02 COMMUNICATIONS - GENERAL

A. Telephone communication and correspondence shall be between Contractor's Representative and the Architect.

B. Subcontractors shall not contact members of the design team directly unless explicitly agreed to by Contractor, Architect and Owner. Such contact and discussions shall be documented in writing by the subcontractor and submitted to the Architect and Owner through the Contractor.
   1. Subcontractors shall transmit problems or questions in writing using a Request for Information (RFI) form through the Contractor.

C. Incorporate any cost affect this may have on the progress of the Project into the Base Bid. No overtime payments will be authorized, or time delays allowed, for the Contractor or subcontractors to communicate with the Architect, or Owner outside of the Contractor's normal working hours.

D. On-Site Lines of Authority and Communications: Establish on-site lines of authority and communications including attendance at pre-construction meeting and progress meetings as required by the Architect and Owner. All on-site lines of authority and communications shall be established through the Architect.

1.03 EMERGENCY COMMUNICATION

A. Emergency Communication: Establish an Emergency List for use in case of emergencies during off-hours.
   1. Identify a person under General, Mechanical and Electrical from the telephone list that will be available during all off-hours with authority to address any emergency situation. Additional names and numbers may be required to be provided depending on the trade and activity.
   2. Submit the list to the Architect, who will include the same information for design team members and Owner.

B. At each telephone, post a list of important telephone numbers including:
   1. Police and fire departments;
   2. Ambulance service;
   3. Architect's office;
   4. Engineers' offices;
   5. Owner/Owner's Representative's office;
   6. General Contractor's home office;
   7. Principle subcontractors' field and home offices;
      a. Provide the following for each subcontractor:

1) Two names;
2) Cell phone and land line telephone numbers for staff capable of addressing an emergency issue that may occur outside of normal business hours.

1.04 CORRESPONDENCE

A. Correspondence to and from Contractor shall be routed through Architect with a copy to Owner.

B. Number correspondence sequentially beginning with Serial Number 001. Include Owner's project title and project number.

1.05 REQUEST FOR INFORMATION (RFI)

A. When field conditions or Contract Document contents require clarification or verification by the Architect or Architect's consultants, a written RFI shall be submitted in conformance with the following:
   1. Identify the nature and location of each clarification/verification; provide as a minimum the following information:
      a. Project name and number;
      b. Date;
      c. Date response is required by; allow 5 business days for returning responses. The consultant will expedite those RFI's indicated by the Contractor as being critical to the construction process.
      d. RFI number;
      e. Subject;
      f. Initiator of the question;
      g. Indication of costs, if known;
      h. Location on site;
      i. Contract drawing reference;
      j. Contract specification section and paragraph reference;
      k. Descriptive text;
      l. Space for reply on same page as questions; and
      m. Single subject matter, 1 item each - architectural, civil, structural, mechanical, electrical.
   2. Number each RFI sequentially beginning with #001. Only one question per RFI.

B. Route and Copy: RFI's in same manner as correspondence

1.06 COOPERATION AND COORDINATION OF WORK

A. General:
   1. Coordinate scheduling, submittals, and work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
   2. Coordinate work between the parts of the Contract Documents to avoid conflicts and omissions.
   3. Coordinate installation of the work and that of subcontractors to ensure compliance with the Contract Documents and to expedite the progress of the Project.

B. Ensure that the work of subcontractors complies with Conditions of the Contract, Division 01 - General Requirements, and the work of other Sections related to their own work. No additional payments or time extensions will be authorized for failure on the part of subcontractors to be familiar with and in compliance with the aforementioned specification divisions and sections.

C. Project Coordination and Scheduling Control: Responsibility for coordination and close adherence to time schedules rests solely with the Contractor who shall maintain coordination and scheduling control at all times:
   1. Each subcontractor responsible to the Contractor shall cooperate diligently with the Contractor in the execution of their work so as to cause no delay in the completion of the Project. This responsibility includes the completion of work in a timely manner and items of equipment connected and fully operating at the time of Substantial Completion of each phase. Each subcontractor shall diligently comply with the following requirements:
      a. Cooperate in planning and layout of the work well in advance of operations to properly interface with work of other trades and Owner's separate contractors.
         1) Include planning, layout and review of mock-ups and field samples.
         2) Include Owner-furnished and Owner-installed items as required.
      b. Inform other trades of requirements at proper time to prevent delay or revisions.
      c. Be informed on the requirements of other trades and check own work for conflicts with the work of other trades.
      d. Ensure delivery of materials and performance of work on coordinated schedule with other trades.
      e. Attend Pre-Installation conferences as described in Section 01 31 19, Project Meetings.
   2. Notify Owner and Architect in a timely manner of items/issues requiring field verification by Architect and consultants.

D. Notification and Correction of Defective Work:
   1. Before starting a section of work, each contractor and subcontractor shall carefully examine preparatory work that has been executed to receive each contractor's work. Check carefully, by whatever means required to ensure that the work and adjacent, related work will finish to proper contours, planes, and levels.
   2. Subcontractors shall promptly notify the Contractor of any defects or imperfections in preparatory work which will in any way affect satisfactory completion of work. Under no condition shall a section of work proceed prior to preparatory work having been completed, cured, dried, or otherwise made satisfactory to receive such related work.
   3. Correction of defective work shall be the responsibility of the Contractor.

E. Dimensions:
   1. The Structural Drawings shall be used in conjunction with the Architectural Drawings. Primary structural elements are dimensioned on the structural plans and details. Not all secondary dimensions are shown, such as exact door and window locations, wall configurations, slab slopes and depression, curbs, and the like. Coordination of the structure with the dimensions as shown on the drawings and architectural items to be embedded into, or attached to the structure, is the responsibility of the Contractor.
   2. Dimensional discrepancies between the Architectural and Structural Drawings shall be reported to the Architect before proceeding with the work.

F. Intent of Drawings: The work of each contractor and subcontractor shall conform to the intent of the contract drawings. Drawings are partly diagrammatic and do not intend to show in detail all features of work. Each contractor shall carefully review the work to be performed by other trades, compare related drawings and shall thoroughly understand the building conditions affecting their work.
   1. Changes required in the work caused by failure to do so shall result in no change in Contract Sum or Contract Time.

G. Interferences and Right-Of-Way:
   1. Make proper provisions to avoid interferences.
   2. Submit conflicts that cannot be resolved by right-of-way to Architect for instructions.

H. Cooperate and coordinate with any other separate contractors and subcontractors under Contract with the Owner.

I. Coordination Drawings:
   1. The purpose of coordination drawings is to resolve potential interdisciplinary dimensional interferences and conflicts prior to shop fabrication or field installation of components and systems. While the designers have exercised the accepted standard of care in performing overall dimensional coordination in the preparation of the construction documents, additional factors influence coordination which the contractors must address in the coordination drawings. These factors include, but are not limited to, specific means and methods, the sequence of work, the characteristics of the specific equipment to be installed (where the documents allow multiple options), recognition of existing conditions, and the bidding assumptions made by each contractor.
   2. Prepare coordination drawings, consisting of plans, sections, and details, for those areas of the facility where the dimensional location of one trade's work could adversely influence the dimensional location of other trades' work. Drawings shall depict the interrelationships of components shown on separate shop drawings, the installation sequences, and how work is to be installed or constructed in relation to the work of other trades.
   3. Areas for which coordination drawings shall be prepared include, but are not limited to, and as applicable:
      a. Trusses supporting integral roof edge gutter and downspouts.
   4. Prepare coordination drawings in accordance with the following guidelines:
      a. Sheet size shall be the same as the construction documents.
      b. Plans shall at an appropriate scale to depict the necessary detail, but not less than 1/4 inch = 1 foot.
      c. Sections shall be at an appropriate scale to depict the necessary detail, but not less than 1/2 inch = 1 foot.
      d. Drawings shall contain elements of the construction in their correct dimensional relationship, including but not limited to, ceiling/roofs, walls, beams, columns, openings, supports, hangers, earthquake bracing, fixtures, and all other appurtenances.
      e. Review with Architect drafting method, whether digital or hand-drafted drawings are appropriate.
   5. Contractor and each subcontractor shall sign drawings to indicate their participation in the coordination process and their agreement that the individual systems and components can be installed as indicated in the drawings and in the conformance with the contract documents.
   6. These drawings shall be submitted for informational purposes only prior to installation of any components of the work to be included in order to demonstrate that the installation of the aforementioned items have been coordinated by the Contractor prior to commencement of the work.

1.07 COORDINATION OF SUBMITTALS

A. Schedule and coordinate submittals specified in Section 01 33 10, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data and Samples.

B. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service equipment.

C. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and effect on work of other sections.

1.08 COORDINATION OF SPACE

A. Coordinate use of Project space and sequence of installation of all work which is indicated diagrammatically on Drawings. Follow routings shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

B. In finished areas, except as otherwise shown, conceal pipes, ducts, wiring and the like within the construction. Coordinate locations of fixtures and outlets with finish elements.

1.09 COORDINATION OF CONTRACT CLOSEOUT

A. Coordinate completion and cleanup of work by the various trades involved in preparation for Substantial Completion.

B. After Owner occupancy of premises, coordinate access to Project Site by the various trades involved for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

C. Assemble and coordinate closeout submittals specified in Section 01 77 00, Closeout Procedures, and Section 01 78 00, Closeout Submittals.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Administrative and procedural requirements for project meetings, including following:
a. Preconstruction meeting;
b. Progress meetings;
c. Monthly construction schedule meetings;
d. Record Documents update meeting;
e. Coordination meetings;
f. Pre-installation meetings prior to starting certain work;
g. Project closeout meetings.

B. Related Sections:
1. Section 01 32 16 - Construction Schedules

1.02 PRECONSTRUCTION MEETING

A. The Owner will schedule a preconstruction conference before starting construction, at a time convenient to the Contractor and the Architect, but no later than 7 days after Notice To Proceed (NTP). The conference will be held at the Project Site, another convenient location as selected by Owner, or as otherwise designated.

B. Attendance is required of the following:
1. Architect and Architect's consultants;
2. Owner;
3. Contractor's Superintendent and Project Manager; Contractor's Quality Control (CQC) Representative if different individual than the Project Manager.
4. Major subcontractors;
5. As required by City of Mercer Island or Historic Preservation authorities;
6. Others, as requested.

C. Discussion shall cover items of significance, including the following:
1. Communication chain and persons authorized to direct changes;
2. Responsibilities and authority of Owner or Owner's Representatives, Architect, Contractor and Contractor's designated personnel, and Inspection agencies.
3. Owner/Contractor Agreement, bonds and insurance certificates;
4. Contractor's use of the premises including:
a. Site mobilization issues;
b. Noise and other interferences;
c. Environmental controls;
d. Work hours.
e. Parking, access and accessibility;
5. List of subcontractors;
6. Schedule review;
7. Sequence of work;
8. Owner's occupancy requirements;
9. The Work;
10. Special project procedures;
11. Distribution, procedures and processing:
a. Application for payments and Schedule of Values;
b. Change Orders (CO);
c. Proposal Requests (RFP);
d. Change Order Requests (CR);

e. Construction Change Directives (CCD);
f. Requests for Information (RFI);
g. Architect Supplemental Instructions (ASI);
h. Field decisions;
i. Submittals and long-lead-time items;
j. Substitutions;
k. Testing and inspections;
l. Others as appropriate.

12. Project record documents including review of as-builts on a regular basis during construction;
13. Construction facilities, and controls;
14. Temporary utilities and utility shutdowns;
15. Security procedures;
16. Cleaning and housekeeping procedures;
17. Equipment deliveries and priorities.
18. Schedule Review;
19. CQC System:
    a. CQC Representative
    b. CQC daily report
20. Hazardous material abatement procedures, if any.
21. Use of site and premises by Owner and Contractor.
22. Federal Labor Provision compliance;
23. Construction Waste Management and recycling plans;
24. Others, as appropriate.

D. The Contractor shall record, produce, and distribute copies of the minutes to the Owner, Architect and other contractor attendees within 3 business days of the meeting.

E. The Architect will:
1. Conduct the meeting.
2. Review the minutes of the Meeting and respond to the Contractor within 5 business days of receiving the meeting minutes.

1.03 PROGRESS MEETINGS

A. For purposes of coordination and scheduling, after start of the work, Contractor's QC representative, project manager and superintendent and all subcontractors whose work is in progress as otherwise requested, shall attend progress meetings which shall be held every week at the Project Site or as otherwise designated, to enable an orderly review of the construction progress and to provide for systematic discussion and analysis of concerns that may arise relative to execution of the Work.

B. Contractor and subcontractors shall incorporate attendance at these meetings as part of the Base Bid of the project – no overtime payments will be authorized for Contractor or subcontractors to attend weekly Progress Meetings or other special meetings if required.

C. Meeting Locations: On site, in meeting room provided by the Owner, or online meeting, as determined.

D. Attendance: Representatives attending meetings are required to be qualified and authorized to act on behalf of their firms. Attendance shall include:
1. Architect and Architect's consultants, as appropriate;
2. Owner/Owner's Representative;
3. Contractor's Superintendent, Project Manager, and QC Representative;
4. Subcontractors, as appropriate;
5. Suppliers, as appropriate;

6. Others, as appropriate.

E. Agenda: Discussion will pertain to items, such as:
   1. Attendees; list of attendees and company they represent;
   2. Review and approve minutes of previous meeting; written corrections, additions and/or deletions to previous minutes acknowledged;
   3. Review work in progress since previous meeting together with previous schedule;
   4. Review plans for progress for subsequent work period together with new schedule;
   5. Review construction schedule; confirm current status of work and interface requirements;
   6. Present corrective measures and procedures to regain project schedule, as applicable;
   7. Present field observations, problems, and conflicts;
   8. Discuss problems impeding progress schedule;
   9. Review Contractor's quality control system; discuss any concerns and corrective measures;
   10. Review submittal schedules and logs; present methods to expedite as required;
   11. Review off-site fabrication;
   12. Review delivery schedules;
   13. Review outstanding RFIs;
   14. Review proposed changes for:
      a. Effect on construction schedule and on completion date;
      b. Effect on any other contracts of the project.
   15. Review Change Order Proposal log and finalize prices;
   16. Review draft of Application for Payment (at end of month);
   17. Confirm status of the record ("as-built") drawings and review required revisions to Project Record Documents; see update requirements specified below;
   18. Confirm status of Shop Drawing submittals and approvals;
   19. Review project safety;
   20. Review any outstanding Non-Compliance Notices;
   21. Review any other business;
   22. Confirm next meeting date, location and time plus those requested to be in attendance.

F. Architect will:
   1. Administer progress meetings throughout work progress;
   2. Review the minutes of the Meeting and respond to the Contractor within 3 business days of receiving the meeting minutes.

G. Contractor shall:
   1. Ascertain that work is prosecuted consistently with contract documents and construction schedules.
   2. Record, produce, and distribute copies of the minutes to the Owner and Architect within 5 business days of the meeting.
   3. Distribute copies to all other contractor attendees.

H. At Contractor's option, progress meetings can be held integrally with monthly CPM scheduling meeting and Record Documents Update meeting specified herein.

I. Contractor shall provide the following at each meeting:
   1. Current (and updated if necessary) construction schedule.
   2. One set of record documents (drawings, specifications, COs, RFPs, RFIs, ASIs, CCDs, CRs, and the like).
   3. Current (and updated if necessary) submittal schedule.
   4. Current (updated) set of Project Record Documents.

1.04 RECORD DOCUMENTS UPDATE MEETING

A. Contractor shall, at least once a month, meet with major subcontractors whose work is in progress at the Project Site, including but not limited to mechanical, plumbing, electrical, fire sprinkler, masonry, metal fabrications and structural steel, civil, and as otherwise designated, to review and verify incorporation of revisions of the previous month and transfer non-recorded installed record information to the day-by-day working set of "Project Record Copy" prints, with revisions clearly indicated in red pen.
   1. Where applicable, said information shall be obtained from generated coordination drawings; refer to Section 01 31 13, Project Communications and Coordination.
   2. Refer also to Section 01 78 00, Closeout Submittals, for basic required information and other provisions related to ‘as-built’ requirements.

1.05 COORDINATION MEETINGS

A. Contractor shall hold coordination meetings with their subcontractors and suppliers as deemed necessary by the Contractor for coordination of the Work. Meetings shall be held on the Project Site or as otherwise designated. The Owner and the Architect will be available to attend such meetings upon request. Refer to Section 01 31 13, Project Communications and Coordination, for additional information and requirements pertaining to coordination meetings.

B. The Contractor shall submit Requests for Information, or any other type of information requests the Contractor may use, for the 3-month work period during the first month after Notice To Proceed to minimize any conflicts that might occur when mobilization begins.

C. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

D. Request representation at each meeting by every trade currently involved in coordination or planning for the construction activities involved.

E. Record meeting results and distribute copies to Architect and Owner and to others affected by decisions or actions resulting from each meeting.

1.06 PRE-INSTALLATION MEETINGS

A. General: Prior to commencement of work listed below or as otherwise determined by the Architect or Owner, the Contractor or his general superintendent, the responsible foremen for the subcontractors performing said work, plus associated sub-subcontractors, suppliers, fabricators, vendors, and others as appropriate, shall attend a meeting for the purpose of establishing a full understanding of the procedures and requirements for the orderly progress of the designated work.

B. Subcontractors and major suppliers shall attend these pre-installation meetings prior to commencing work of their respective specifications Sections, or as required by related work in other specification Sections. Contractor may elect to group several Sections or Divisions to minimize the number of these meetings.

C. Require attendance of entities directly affecting, or affected by, work of the Section including Architect, Owner, Contractor’s Project Manager and Superintendent with Lead Man performing the work, and/or the appropriate Subcontractors/Suppliers/Fabricators.

D. Notify Owner and Architect not less than 7 days prior to scheduled starting of any of the work listed below so that they may schedule said meetings. Applicable submittals as well as the subcontractors' safety plan and insurance certificates shall have been submitted to and

approved prior to scheduling this conference. Work requiring pre-installation meetings includes, but is not limited to, the following:

1. Selective demolition.
2. Cast-in-place concrete and pre-cast concrete.
3. Masonry cleaning and restoration.
4. Metals (restoration, structural steel and metal deck).
5. Division 07 waterproofing, roofing, flashing, sealants, pedestal/pavers.
6. Painting and high-performance coatings.
7. Concrete countertops.
8. Others, as indicated in specification sections.

E. Work Plan: Develop a work plan for each definable segment of work. Complete the work plan prior to the pre-installation meeting, and this shall serve as the basis for discussion and contract compliance. Include a review of contract requirements to assure that materials and equipment delivered and assembled for construction conform to contract requirements and that control testing, including procedures, are finalized. Examine work areas, upon which new work is to be placed, to verify the substrate for the new phase of work.

F. Agenda:
   1. Review technical contract requirements with any options. Submit options and resolve with Owner any conflicts, interference, or compatibility problems.
   2. Insurance and certifications.
   3. Review requirements as relates to:
      a. Schedule.
      b. Submittals and mock-ups/field samples - status of approval; review contract requirements. Note: All submittals pertaining to a pre-installation meeting shall have been reviewed by Architect and returned to Contractor.
      c. Tolerances.
      d. Manufacturer's requirements.
      e. Weather limitations.
   4. Materials - available and ready for use.
   5. Persons responsible for work.
   6. Quality control methods:
      a. Testing/Inspection requirements - required inspections and tests, who samples and how often? Criteria for performance of work.
      b. Acceptability of substrates - criteria for approving substrate.
      c. Required performance results.
      d. Recording requirements.
   7. Applicable governing rules and regulations.
   8. Temporary facilities and controls:
      a. Safety, environmental controls, security, noise.
      b. Space and access limitations.
   9. Protection of work, curing periods and related subjects.
   10. Other business.

G. Architect will record, reproduce and distribute copies of minutes prior to the next meeting or within 7 days of each meeting to all meeting participants.

1.07 PROJECT CLOSEOUT MEETINGS

A. For the purpose of attaining project closeout, commencing immediately following established date of Substantial Completion, Contractor's project manager and superintendent and all subcontractors who have outstanding punch list items associated with their work, or as otherwise requested and including all subcontractors involved in the building systems commissioning process, shall attend weekly closeout meetings which shall be held at the Project Site, or as otherwise designated.

B. Such meetings shall be held to review and discuss the resolution of all punch list items in order to attain Final Completion. Closeout meetings shall continue on a weekly basis until all punch list items have been resolved and Final Completion is attained.

1.08 ADDITIONAL MEETINGS

A. As the construction progresses, additional meetings may be required under this Contract. These may be called at the direction of or by the Architect or Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. This Section supplements General Conditions requirements as modified and specifies administrative and procedural requirements for preparation of a preliminary Construction Progress Schedule, Contractor's final master Construction Progress Schedule (also referred to as Construction Schedule and Progress Schedule), and monthly updates.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements

1.02 DEFINITIONS

A. "Day," as used throughout the Contract unless otherwise stated, means "calendar day".

1.03 SYSTEM DESCRIPTION

A. System Requirements: The purpose of the schedules and reports is to:
1. Ensure adequate planning and execution of the work by Contractor so that it is completed within the milestone dates and total number of working days allowed in the Contract.
2. Establish standard against which satisfactory completion of Project shall be judged.
3. Assist the Architect and Owner in monitoring progress.
4. Assess the impact of any changes to the Contract.
5. Support the basis for progress payments.

B. Float or Slack Time in the Schedule:
1. Float time is defined as the amount of time between the earliest start date and latest start date, or between the earliest finish date and latest finish date of an activity or chain of activities on the 'Critical Path Method' (CPM) Construction Schedule.
2. Joint Ownership of Float: The Contractor's construction schedule will begin with the date of issuance of Notice to Proceed and conclude with the date of Substantial Completion of the Project, which is the Time of Completion indicated in the Bid Proposal. Float or slack time within this construction schedule is not for the exclusive use or benefit of either the Owner or the Contractor, unless otherwise identified in these Contract Documents, but is a jointly owned project resource available to both parties as needed to meet Contract milestones and the Contract Substantial Completion date. Any float time to activities not on the critical path shall belong jointly to the Contractor and Owner, and may be used by the Contractor and Owner throughout the construction process. However, the Contractor and Owner can mutually reserve and apportion float time according to the needs of the Project.
3. Limited Damage for Delay:
a. No time extensions will be granted nor delay damages paid until a delay occurs that impacts the project's critical path, consumes all available float or contingency time available, and extends the work beyond the specified contract completion date.
b. Any float time remaining at the established date of Substantial Completion shall belong to the Owner, and may be used by the Owner in determining if additional contract days are to be awarded for changes in the Contract or for delays to the Contract caused by the Owner. The Contractor shall not be entitled to any adjustment in the Contract Time, the Contract Schedule, or the Contract Price, or to any additional payment of any sort by reason of the Owner's use of any

float time remaining between established date of Substantial Completion and the final completion date.

C. If the Contractor should desire or intend to complete the Work earlier than any required Milestone or Completion date, the Owner or Architect shall not be liable to the Contractor for any costs or other damages should the Contractor be unable to complete the Work before such Milestone or Completion date.

1.04 SUBMITTALS

A. General: Comply with pertinent provisions of Section 01 33 10, Submittal Procedures.

B. Schedule submittals, including schedule updates, shall be reviewed jointly by the Architect and the Contractor. The Owner may contract for independent certified CPM scheduler assistance, acting on behalf of the Owner throughout the project, in reviewing and providing recommendations regarding the draft and regular updates of the Contractor's schedule. Such review of the Contractor's schedules shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing or its ability to complete the Work in a timely manner. Neither the Owner's nor the Architect's review will relieve the Contractor of the sole responsibility for the accuracy, adequacy, or completeness of the schedule, the logic of the schedule, and/or completion of the Contract requirements in accord with such schedule. Neither Owner's nor Architect's review shall constitute acknowledgment that the relationships between various work items or activity durations are reasonable or appropriate.

C. Construction Progress Schedule:
1. Preliminary Construction Progress Schedule: Within 14 days after date of Contract Execution, submit a complete Contractor's Construction Schedule to the Owner and Architect for Owner's and Architect's review. Resubmit until schedule meets all requirements of this Section.
2. Initial submittal shall be in the form of three color prints, in addition to providing an electronic PDF file of the baseline schedule.
3. The Owner and Architect will review the substance of Contractor's Construction Progress Schedule and return to the Contractor with comments within 7 days. Within 7 days following return of reviewed Construction Schedule, meet with the Architect to discuss review comments and revisions to the Schedule.
    a. Within 7 days following said meeting, submit a final Construction Schedule implementing all revisions as directed in the above noted meeting.
    b. This submittal shall be in the following form:
        1) Four colored copies, with the critical path highlighted in bold contrasting color, and an electronic PDF file.
        2) Two full size plot copies of the computerized reports sorted by activity identification number, early start, total float and cash flow curves indicating early and late starts.
        3) Four copies of the corresponding Schedule of Values and an electronic PDF file.
    c. Provide the same for each update.
4. Final Construction Schedule: When submitting the final approved schedule, include cover letter of transmittal and include a statement that the schedule has been completed and concurred with by its subcontractors.
5. Progress Payment will be withheld until Contractor's Construction Schedule has been submitted in final form and content satisfactory to the Architect and Owner.
6. Submittal Schedule: Provide separate schedule for submittals, coordinated with final approved Construction Schedule. Submit within 30 days of Notice To Proceed.

D. Periodic Updates to Construction Progress Schedule: Submit an Updated Construction Progress Schedule with each request for a monthly progress payment as required in Part 3 of this Section.

E. Distribution: Copies of reviewed schedule and every revision thereof shall be submitted to the Architect, the Owner, and to everyone whose time performance is essential to achieving the progress shown on the schedule.

1.05 QUALITY ASSURANCE

A. Experience of Scheduler: Employ a scheduler who is thoroughly trained and experienced in compiling construction schedules, in analyzing schedules by use of the Critical Path Method, and in preparing and issuing periodic reports as required.
   1. Replace any scheduler whom the Owner deems incompetent.

B. Coordination with Subcontractors and Suppliers:
   1. The scheduler shall prepare the project schedules and their updates in cooperation with major subcontractors and suppliers.
   2. In scheduling work of subcontractors and deliveries by suppliers, the Contractor represents that he has agreement regarding schedule with those supplying materials and performing the work.

C. Reliance Upon the Reviewed Schedule:
   1. Construction Schedule, as reviewed by Architect, will be an integral part of Contract and will establish interim completion dates for various activities under the Contract.
   2. Should any activity on the critical path not be completed within 15 days after the stated scheduled date, the Owner will have the right to require the Contractor to expedite completion of the activity by whatever means appropriate and necessary, without additional compensation to the Contractor. In addition, Contractor shall submit a “Recovery Schedule” which shall logically demonstrate method or methods Contractor proposes to initiate to get back on schedule within 30 days of said date; i.e., additional trade persons, shifts, work days, or crews.
   3. In addition to above, should any activity be 15 days or more behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate.
   4. Costs incurred by the Owner and the Architect in connection with expediting construction activity shall be the responsibility of the Contractor.
   5. Failure by the Owner to exercise the option either to order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered to set a precedent for any other activities.

PART 2 - PRODUCTS

2.01 CONSTRUCTION PROGRESS SCHEDULE REQUIREMENTS

A. Critical Path Network Analysis Diagram:
   1. Prepare and maintain a computer-generated construction progress schedule using Microsoft Project software consisting of a network analysis system generally known as the Critical Path Method (CPM). Software version shall match versions owned by Owner and, where applicable, independent scheduler.
   2. Comply with "The Use of CPM in Construction--A Manual for General Contractors" published by the Associated General Contractors of America, Inc.
   3. Graphically show the order and interdependence of activities necessary to complete the Work, and sequence in which each such activity is planned to be accomplished.
   4. Commence construction progress schedule preparation immediately following Notice of Award of the Contract.

5. Key the construction progress schedule to the Schedule of Values in order to aid analysis of monthly payment requests.

B. Required Data: Show complete sequence of construction by activity, indicating critical path of activities, including but not limited to:
   1. The schedule duration shall be based on the Contract Time listed on the Bid Form. Owner shall not be obligated to accept any early completion schedule suggested by the Contractor. The Contract Time shall establish the schedule completion date. If the Contractor feels that the Work can be completed in less than the specified Contract Time, then the surplus time shall be indicated on the schedule as project float.
   2. Date for Notice to Proceed;
   3. Date for Substantial Completion;
   4. Critical path;
   5. Project mobilization;
   6. Operating constraints and sequences specified by Owner;
   7. Shop Drawing, product data, samples, mock-up submittals and reviews, by specification section;
   8. Date for final color selections to not affect the Critical Path;
   9. Provide demolition schedule as indicated in the Construction Documents;
   10. Planned versus actual status for each Work activity;
   11. Material procurement - fabrication, delivery to Project Site, and installation - of equipment and critical materials;
   12. Fabrication of special material and equipment, its installation and testing;
   13. Any intermediate (milestone) completion dates identified in the Contract Documents; include coordination activities as milestones, such as utility outages and City inspections;
   14. Show interrelationships and dependencies including activities of separate contractors;
   15. Long lead items;
   16. Testing, and other close out activities;
   17. Show Construction Change Directives (CCD) and Change Orders (CO) when they impact the critical path of the schedule;
   18. Punch list;
   19. Punch list corrections;
   20. Final cleanup;
   21. All activities by the Architect that affect progress, required dates for completion, or both, for all and each part of the Work.

C. Number and Duration of Activities on the Network Analysis:
   1. Treat each trade or type of work as a separate activity or set of activities on the network analysis. Each activity shall be coded for responsibility (e.g. Contractor, Owner, Architect), and Subcontractor.
   2. Submittal and review activities for shop drawings, samples, and the like, shall allow reasonable durations for preparation of submittals, submittal review, revisions and re-submittal review. Refer to Section 01 33 10, Submittal Procedures, for specified durations for processing submittals by the Architect and Architect's consultants, or the Owner and Owner's consultants, as applicable. Shorter review times for critical submittals may be negotiated on an individual basis. Re-submittals shall have the same review times allotted as the initial submittals. Re-submittal of shop drawings or samples necessitated by required corrections shall not be cause for extension of time. If certain submittals are critical, they shall be so identified at the time of submission to assure priority treatment. The submittal activities shall have the appropriate logic ties to delivery and construction activities.
   3. No activity or task shall be longer than 15 calendar days duration, with shorter durations if they affect other activities. The activities shall show early and late start, early and late finish, and float dates. Break down major tasks into sub-tasks or by area to meet this criteria.

4. Where activities extend more than 15 days divide activities into logical component activities.
5. Show on the diagram, as a minimum for each activity, preceding and following event numbers, description of each activity, cost, and activity duration in calendar days.

D. Cost and Manpower Loaded Schedule: Construction activities which occur on-site shall be cost loaded with costs, manpower and equipment.
1. Show dollar value of activities correlated to schedule of values.
2. Show manpower for each activity.

E. Baseline Schedule: The initial Schedule when reviewed by the Architect and Owner shall be identified as the Baseline Schedule and shall be known as Revision 0. Each subsequent reviewed change to the Schedule shall be as a Revision numbered in sequence (Revision 1, 2, 3, etc.). The first update shall include the preliminary schedule activities and remaining activities updated as of the second monthly pay request.

PART 3 - EXECUTION

3.01 PRELIMINARY CONSTRUCTION PROGRESS SCHEDULE

A. General: Submit the Preliminary Construction Progress Schedule to the Architect showing all elements itemized in 2.01 B above.
1. The schedule shall have been developed by the Contractor in conjunction with its subcontractors.

B. Re-submittal: Re-submit the Preliminary Construction Progress Schedule to the Architect until the schedule meets all requirements of this Section.

C. Scope of Preliminary Construction Progress Schedule: The Preliminary Construction Progress Schedule shall detail, at a minimum, all work which will be accomplished in the first 60 calendar days following the Notice to Proceed. The general approach of the balance of the work shall be indicated.

D. Limitation on Construction:
1. Mobilization and submittals can be in process during the review period.
2. No construction work shall be permitted until the Preliminary Construction Progress Schedule is submitted to, and reviewed and approved by Owner.

E. Initial Construction Progress Payment: The first pay request will be based on the update of the preliminary schedule.

3.02 COMPLETE CONSTRUCTION PROGRESS SCHEDULE

A. General: Submit the complete (Master) Construction Progress Schedule to the Architect within 14 days following the Notice to Proceed.

B. Subcontractor Participation: Involve all major subcontractors in preparation of the Master Construction Progress Schedule.
1. Obtain approval of the schedule from each major subcontractor and submit in writing together with the final Construction Progress Schedule.

C. Progress Payments:
1. Will be withheld in the absence of a reviewed Construction Progress Schedule.

2. No adjustment or extension of time will be granted for failure to meet the activity dates as shown. Failure to comply with these requirements will be cause for rejection of any progress payments presented thereafter, until such time as the requirements are met.

3.03 UPDATES

A. General:
   1. The scheduler shall attend all meetings concerning project progress, alleged delays, or time impact.
   2. The schedule shall be modified to reflect the original Contract completion date, subject to review by the Owner. Prior to submittal of the schedule update, the Contractor shall submit an advanced worksheet indicating the intended report status. The Owner, Architect and Contractor shall then meet and agree upon the completion status of the work in progress, and any major logic changes proposed by Contractor.
   3. Maintain the Construction Schedule at the project meeting location and update weekly by drawing a line vertically through the corresponding progress of each task on the schedule as of the date of that project meeting. The line shall be in varying colors so that differentiation between weeks is readily apparent.

B. Progress Meetings:
   1. Update the Construction Schedule at each Progress Meeting (twice per month).
   2. Indicate "actual" progress in percent complete for each activity.
   3. Any deviation from the planned schedule shall be explained by Contractor, with corrective measures, if necessary, to bring progress of Work back in line with the Contract Completion date.

C. Monthly Update:
   1. If substantial changes have occurred in the Construction Schedule, or if enough changes have occurred that the schedule is rendered inaccurate or ineffective, submit a revised updated Construction Schedule with the next application for payment showing the original baseline schedule and revised schedule on the same copy for evaluation and measurement of actual work-in-place.
   2. If the Contractor does not submit a revised schedule with a payment request, it is agreed by the Contractor that the project is still on schedule according to the last submitted schedule.
   3. Maintain an ID system so that if the logic changes, or other tasks are inserted, the original task and any inserted task always maintain the originally assigned ID number.
   4. Submit an updated schedule at the monthly progress meeting following either one of the following two occurrences:
      a. Upon completion of a major milestone; or,
      b. When the actual work completed is more than 15 days behind schedule: Should the schedule show the project completion to be more than 15 days behind, submit a written explanation and recovery schedule outlining corrective action taken or proposed to bring events back on schedule within a 30 day period.
   5. Show changes occurring since previous schedule submission, such as:
      a. Any major changes in scope, including authorized Construction Change Directives or Change Orders;
      b. Contractor reorganization of his work sequence unrelated to changes in scope;
      c. Activities modified since previous submission;
      d. Revised projections for progress and completion, as applicable; and
      e. Any other identifiable changes.
   6. Provide narrative report as needed to define:
      a. Problem areas, anticipated delay, and impact of these on schedule; and
      b. Corrective action recommended and its effect.

7. Subcontractor Participation: Involve major subcontractors in preparation of the Periodic Updates of the Construction Schedule. Obtain approval of the schedule from each major subcontractor and submit in writing together with the Periodic Updates of the Construction Schedule.

D. Change Orders:
   1. Refer to City of Mercer Island Section 00 72 00 General Terms and Conditions Article 6, Time and Price Adjustments.
   2. Authorized changes to the work shall be included in the schedule network as they occur in the same format and level of detail as contained in the current updated schedule. Enough activities shall be included to adequately describe the work. Code the activities in such a way that they can be identified to the specific Change Order. Insert the Change Order Activities in the network with appropriate logic ties to original network activities.
   3. Utilize the time impact analysis submitted with the change order to demonstrate the effect of delays on the overall project schedule.

3.04 RECORD ("AS-CONSTRUCTED"/"AS-BUILT") SCHEDULES

A. General: At the completion of the Project submit an as-constructed progress schedule.
   1. The Contractor's Project Manager and Project Scheduler shall certify the progress schedule as representing the way in which the Project was actually constructed.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Administrative and procedural requirements for the following:
a. Preconstruction digital photographs:
1) Existing conditions prior to demolition.
2) Other conditions after demolition but prior to construction as required.
b. Monthly digital photographic documentation of overall construction progress from four consistent vantage points.
c. Weekly digital photographic documentation of construction progress.
d. Survey digital photographic documentation of installed elements as requested.

B. Related Sections:
1. Section 01 33 10 - Submittal Procedures
2. Section 01 78 00 - Closeout Submittals

1.02 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures:
1. Construction Photographs:
a. Submit pre-construction photographs at first project meeting.
b. Submit overall construction progress photographs once a month.
c. Submit photographic documentation weekly during construction, and daily at critical points of construction.
d. Submit complete set of photographs to Architect via email with each application for payment.
e. Identify images as described in Subparagraph 2.01 B.

B. Submit closeout data in accordance with Section 01 78 00, Closeout Submittals:
1. Project Record Documents: Complete set of digital image electronic files.

1.03 QUALITY ASSURANCE

A. Field Office Images: Keep one set on-site as on-going record. Construction images shall be available in the field office at Project site, at all times for reference and as on-going record. Identify images same as for those submitted to Architect.

PART 2 - PRODUCTS

2.01 MEDIA AND DOCUMENTATION

A. Photograph Format and Resolution:
1. Photographs: Provide images in pdf or jpg format, produced by a digital camera.
2. Resolution: Photographs shall be in focus and clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
3. Submit digital images exactly as originally recorded in the digital camera, uncropped, without alteration, manipulation, editing, or modifications using image-editing software.

B. Identification: Identify each image submitted, with the following information:
1. Date and time stamp by camera.
2. Unique sequential identifier / file name:
a. Name of Project.

b. Name of Contractor.
c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

3. Indicate element or system being documented.

C. Maintain key plan with each set of construction photographs that identifies each photographic location.

D. Maintain images in folders corresponding to Drawings and major project elements.

PART 3 - EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

A. Preconstruction: Prior to commencement of demolition, take digital photographs of Project including existing items to remain during construction, from different vantage points, as directed by Architect.
1. Take photographs of work as directed by Architect.
2. Take photographs to show existing conditions adjacent to property before starting the Work.
3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

B. Monthly Photographs: Photo document construction progress from four consistent exterior vantage points over the course of construction to show the status of construction and progress since last photographs were taken. Architect shall approve initial vantage points, and any change of vantage points, prior to submittal.

C. Photographic Documentation:
1. Existing conditions after demolition and prior to preparation for new Work.
2. Brick repair.
3. Stone parapet repair.
4. Roofing.
5. Other photo documentation of installation progress and installed elements.

D. From time to time, Architect and Owner may instruct photographer about number and frequency of photographs and general directions on vantage points.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. *General* submittal procedures, further described in other sections, including but not limited to:
a. Construction schedules and reports as required by Section 01 32 16.
1) Include Submittal Schedule.
b. Shop drawings, product data, and samples as required by Section 01 33 23.
1) Materials Safety Data Sheets (SDSs) - Informational Submittals.
c. Testing laboratory and inspection reports as required by Section 01 45 23.
2. Miscellaneous submittals, including but not limited to:
a. Submittals prior to start of construction.
b. Pre-construction and construction progress photographs.
c. Proposed products lists.
d. Manufacturers' installation instructions.
e. Manufacturers' Certificates.
f. Permits.
g. Project closeout submittals other than those described in Section 01 77 00, and Section 01 78 00.

B. Related Sections:
1. Section 01 26 00 - Contract Modification Procedures
2. Section 01 29 10 - Applications for Payment
3. Section 01 31 19 - Project Meetings: pre-construction submittals and minutes
4. Section 01 32 16 - Construction Schedules
5. Section 01 33 23 - Shop Drawings, Product Data and Samples
6. Section 01 45 23 - Testing and Inspection Services
7. Section 01 61 00 - Basic Product Requirements
8. Section 01 78 00 - Closeout Submittals

1.02 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.

1.03 SUBMITTAL PROCEDURES

A. Submittals: Electronic submittals shall be required. No hard copies except for samples.
1. Make submittals through Architect.
2. See Section 01 33 23 for distribution.

B. CAD Drawings of the Contract Drawings: Upon request, and upon receipt of a signed "*CADD/Electronic File Transfer to Contractor*" (see form at the end of this Section), one electronic copy of CADD Drawings of the Contract Drawings will be provided to the Contractor for use in preparing Shop Drawings and Submittals. No files will be released until signed request form is received by Architect.
1. Contractor shall be responsible for distribution of files.
2. Electronic files may not be used for purposes other than for the project for which the documents were prepared.

3. Data contained in the electronic documents does not supplement, modify, or replace Contract Documents as originally issued or modified for this Project.
4. Architect's CADD Files: Files of text, data, graphics, or other information stored in Electronic Files are not Contract Documents and are furnished by Architect solely for the convenience of the Contractor. Refer to form for addition information.
5. Electronic Files provided by the Architect do not reflect as-built conditions. Check, confirm, and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with other contractors for the project.

C. 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.

D. Submittals Schedule: Comply with requirements in Section 01 32 16, Construction Schedules, for list of submittals and time requirements for scheduled performance of related construction activities.
1. Designate in Construction Schedule the dates for submission and submittal review as described in Section 01 32 16.
    a. For Architect's review, allow 7 days.
    b. For submittals requiring Architect's consultant's review, allow additional 14 days.
    c. Allow additional 7 days for submittals which deviate from Contract Documents.
    d. The same processing time is required for each resubmittal.

E. Identification: Identify and include the following information in each submittal:
1. File Name: Begin file name with specification section number; subsequent information as agreed, and as approved by Architect.
2. Include the following information on an inserted cover sheet:
    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name and address of Contractor.
    e. Name and address of each subcontractor, supplier and manufacturer.
    f. Unique identifier, including revision number.
    g. Number and title of appropriate Specification Section.
    h. Drawing number and detail references, as appropriate.
    i. Location(s) where product is to be installed, as appropriate.
    j. Other necessary identification.
    k. Indicate name of firm or entity that prepared each submittal.
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

G. "Revise and Resubmit" Submittals: Resubmit same, in acceptable form/content, clearly identifying deviation from previous submittal content. Refer also, to Section 01 33 23, Shop Drawings, Product Data and Samples.

H. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Architect will return submittals, without review, received from sources other than

Contractor.

1. Transmit each submittal to Architect with AIA Form G810, or as mutually agreed.
    a. Project name.
    b. Date.
    c. Destination (To:).
    d. Source (From:).
    e. Names of subcontractor, supplier, and manufacturer.
    f. Category and type of submittal.
    g. Submittal purpose and description.
    h. Transmittal number.
    i. Submittal and transmittal distribution record.
    j. Remarks.
    k. Signature of transmitter.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals and deviations from requirements in Contract Documents. Include minor variations and limitations. Include same label information as related submittal.
    a. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
3. Indicate date for return of review comments, required to meet Progress Schedule.
4. Electronic Submittals: Bind transmittal in electronic PDF file with submittal.

I. Electronic Submittals: Submit PDF electronic files via email or online project management tool (procore).
1. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project Record Document.
2. Submittal Requirements per Type:
    a. Action Submittals: Reviewed action submittal will be returned electronically.
    b. Informational Submittals: Architect will not return.
    c. Sample Submittals: Submit as indicated.
    d. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures, and Section 01 78 00, Closeout Submittals including Record Documents.
    e. Certificates and Certifications Submittals: Provide a 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.
    f. Field Test Reports.
3. Provide a digital signature where indicated or requested.

J. For Samples, see Section 01 33 23, Shop Drawings, Product Data and Samples.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, Authorities Having Jurisdiction (AHJ), and others as necessary for performance of construction activities. Show distribution on transmittal forms.
1. See Section 01 33 23, Shop Drawings, Product Data, and Samples, for distribution.

L. Use for Construction: Use only final submittals with mark indicating action taken by Architect.

PART 2 - PRODUCTS

2.01 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by Specification Sections.

B. Shop Drawings, Product Data and Samples: See Section 01 33 23, Shop Drawings, Product Data and Samples.

C. 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. Include the following information in tabular form:
   1. Type of product. Include unique identifier for each product.
   2. Number and name of room or space.
   3. Location within room or space.
   4. Number of Copies: Submit electronic copy of product schedule or list, unless otherwise indicated. Architect will return annotated copy.
      a. Retain one annotated copy as a Project Record Document.

D. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 16, Construction Schedules.
   1. Submittals Schedule: Comply with requirements specified in Section 01 32 16.

E. Schedule of Values and Application for Payment: Comply with requirements specified in Section 01 29 10, Applications for Payment.

F. 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. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

2.02 INFORMATIONAL SUBMITTALS

A. Prepare and submit Informational Submittals required by other Specification Sections.
   1. Number of Copies: Submit electronic copy 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 individual authorized to sign documents on behalf of that entity.
   3. Test and Inspection Reports: Comply with requirements specified in Section 01 45 23 Testing and Inspection Services.

B. Coordination Drawings (as required): Comply with requirements specified in Section 01 31 13, Project Communications and Coordination.

C. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 16, Construction Schedules.

D. Construction Progress Photographs. See Section 01 32 33, Photographic Documentation.

E. 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.

F. 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.

G. 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.

H. 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.

I. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

J. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

K. 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.

L. 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.

M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to AHJ, that product complies with building code in effect for Project. Include the following information:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.

N. Schedule of Tests and Inspections: Comply with requirements specified in Section 01 45 23, Testing and Inspection Services. See also, individual technical sections.

O. 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.

P. 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.

Q. 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.
   1. Distribute copies of Field Test Reports to Owner and Architect.

R. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Section 01 78 00, Closeout Submittals.

S. 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.

T. 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 phone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates and required substrate tolerances.
2. Sequence of installation or erection.
3. Required installation tolerances.
4. Required adjustments.
5. Recommendations for cleaning and protection.

U. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and phone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

V. 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.

W. Material Safety Data Sheets (SDS): Submit information to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

2.03 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of a Contractor, provide products and systems complying with indicated performance and design criteria, or where not indicated, with performance and design criteria of Authorities Having Jurisdiction.
1. If criteria indicated is not sufficient to perform services or certifications required, submit a request for additional information.

B. Delegated-Design Services Certification: In addition to engineering, Shop Drawings, Product Data and other required submittals, submit digitally-signed PDF electronic file certificates, stamped by the responsible design professional, for each product and system specifically assigned to the Contractor, to be designed or certified by a design professional.
1. Responsible Design Professional: Professional engineer, legally qualified to practice in State of Washington, and experienced in providing engineering services indicated.
2. 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

3.01 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 as described below 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.

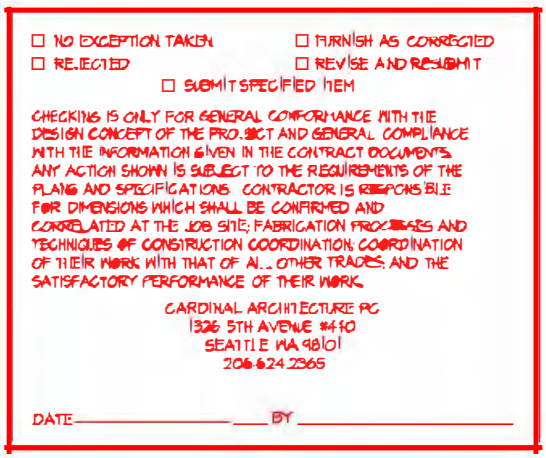
C. Variations from Contract Drawings and Specifications shall be specifically and separately approved by the Architect. Show and describe variations from contract requirements in writing, and submit for approval in conformance with requirements of Section 01 25 00, Substitutions and Product Options.

3.02 ARCHITECT'S ACTION

A. General:
1. Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
3. Submittals not required by Contract Documents may not be reviewed and may be discarded.

B. Informational Submittals: Architect will review each submittal and will return it if found in compliance. Submittals found not incompliance will not be returned.

C. 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, as follows:



D. Architect's review of submittals does not release Contractor from a proper installation, compliance with applicable codes, or coordination of the Work.

END OF SECTION

CARDINAL
ARCHITECTURE PC

Date

Requesting Contact & Address

Regarding: ***CADD/Electronic File Transfer to Contractor***

At your request, we will provide electronic files for your convenience and use related to the Project subject to the following terms and conditions.

Our electronic files are compatible with AutoCAD 2018. We make no representation as to the compatibility of these files with your hardware of your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of our instruments of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of drawings for the referenced project. Any use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or subconsultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following:

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us, and we make no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of you use or reuse of these electronic files.

Please sign this agreement and either mail or email a signed copy to the Architect's address below.

_____ Signature: _____

James Cary, President Officer's Printed Name:

_____

Cardinal Architecture PC Contractor Firm Name:
1326 5th Avenue #440 Contractor Address:
Seattle WA 98101
206.624.2365 T

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Submit Shop Drawings, Product Data and Samples required by the Contract Documents.
a. Submit Coordination Drawings as described in Section 01 31 13, in same manner as Shop Drawings.
2. Pay costs for reproduction, distribution, and materials.

B. Related Sections:
1. Section 01 31 13 - Project Communications and Coordination
2. Section 01 32 16 - Construction Schedules: Submittal Schedule
3. Section 01 33 10 - Submittal Procedures
4. Section 01 78 00 - Closeout Submittals: project record documents

PART 2 - PRODUCTS

2.01 SHOP DRAWINGS

A. Submittals: Provide electronic Shop Drawing submittals. Prepare Shop Drawings using CADD versions of Contract Document drawings as background information. See Section 01 33 10, Submittal Procedures and *CADD/Electronic File Transfer to Contractor form*. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Provide electronic copy (PDF file) for each Shop Drawing submittal.
2. Assemble electronic submittal package into a single electronic PDF file.
3. For large submittals, index file with links allowing navigation to each item.

B. General:
1. Prepare project-specific information, drawn accurately to scale.
2. Submit Shop Drawings for fabricated and other work, as required by Specifications. Fabricate no work until Shop Drawings have been reviewed and accepted.
3. Identify details by reference to sheet and detail, schedule, room numbers, or other reference shown on Contract Drawings.
4. Show by whom materials, items, work, and installation are supplied, performed, or installed. Designate every item, material article, and the like, of installations. Do not use the expression “by others.”
5. If Shop Drawings show variations from Contract requirements because of standard shop practices or other reason, make specific mention of such variations in the transmittal.
a. If indicated departures affect a correlated function, item, article, work, installation or construction of other trades, Contractor shall make note of it in the transmittal. Assume all extra costs involved in related changes.
6. If Architect makes changes in the Shop Drawings varying from Contract and causing Contract sum deviation, notify Architect. Do not proceed with fabrication or installation until Contractor receives written instructions or a Change Order from the Architect.
a. If Contractor proceeds with changes without written instructions or a Change Order, it is assumed that Contractor has accepted additional costs at own expense.
7. Clearly identify revisions on resubmittals Do not make revisions to previously reviewed and approved items.

C. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

1. Dimensions.
2. Identification of products.
3. Fabrication and installation drawings.
4. Roughing-in and setting diagrams.
5. Shopwork manufacturing instructions.
6. Templates and patterns.
7. Schedules.
8. Design calculations.
9. Compliance with specified standards.
10. Notation of coordination requirements.
11. Notation of dimensions established by field measurement.
12. Relationship to adjoining construction clearly indicated.
13. Seal and signature of professional engineer if specified.

D. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 inch x 11 inch but not larger than 30 inches x 42 inches.

E. Distribution for Each Electronic Submittal: Submit via email or online project management tool (procore), as indicated in Section 01 33 10, Submittal Procedures to:
1. Architect;
2. Owner;
3. Consultants.
4. Also note requirements of Section 01 78 00, Closeout Submittals.

2.02 PRODUCT DATA

A. Submittals:
1. Provide electronic copy (PDF file) for Product Data submittals.
2. Assemble electronic submittal package into a single electronic PDF file.
3. For large submittals, index file with links allowing navigation to each item.

B. Collect information into a single submittal for each element of construction and type of product or equipment.

C. 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.

D. Mark each sheet of each submittal to show which products and options are applicable.
1. Clearly identify on each sheet, as applicable:
   a. Pertinent products and models;
   b. Performance characteristics and capacities;
   c. Dimensions and clearances;
   d. Collect required data into one submittal for each unit of work or system; mark each sheet to show which choices and options are applicable to Project.
2. Materials Safety Data Sheets (SDS): For each and every chemical which is known to be present in workplace, submit SDSs. Attach to applicable product data package.

E. Include the following information, as applicable:
1. Manufacturer's written recommendations.
2. Manufacturer's product specifications.
   a. Manufacturer’s Standard Schematic Drawings and Diagrams: Modify drawings and diagrams to delete inapplicable information. Supplement to provide pertinent information.
3. Manufacturer's installation instructions.
4. Standard color charts.
5. Manufacturer's catalog cuts.

6. Mill reports.
7. Standard product operation and maintenance manuals.
8. Compliance with specified referenced standards.
9. Testing by recognized testing agency.
10. Application of testing agency labels and seals.
11. Notation of coordination requirements.
12. Submit other pertinent data as applicable:
    a. Templates to other trades.
    b. Inserts to other trades.

F. Distribution for Each Electronic Submittal: Submit via email or online project management tool (procore), as indicated in Section 01 33 10, Submittal Procedures to:
1. Architect;
2. Owner;
3. Consultants.
4. Also note requirements of Section 01 78 00, Closeout Submittals.

2.03 SAMPLES

A. 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.

B. General:
1. Submit samples for selection of finishes in sufficient time for review cycle in accordance with Construction Schedule as described in Section 01 32 16, Construction Schedules.
2. Office samples shall be of sufficient size and quantity to clearly show colors, textures, and patterns.
3. Samples are required to illustrate product’s functional characteristics with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
4. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
5. 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.
6. 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.
    a. Samples that may be incorporated into the Work are indicated in Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

C. 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.

D. 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, that show full range of color and texture variations expected. Samples include but are not limited to 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.

1. Number of Samples:
    a. Unless otherwise indicated in the technical specifications, submit enough sample sets to allow for Architect to receive two reviewed copies and *each consultant* involved in the sample review to receive one copy.
    b. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
    c. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

PART 3 - EXECUTION

3.01 SUBMISSION REQUIREMENTS

A. Transmit each submittal via email or online project management tool (procore), as described in Section 01 33 10, Submittal Procedures.
    1. Submittals of Shop Drawings and Product Data via fax will not be accepted.

3.02 RESUBMISSION REQUIREMENTS

A. Make corrections or changes in submittals required by Architect and resubmit until accepted.
    1. Revise Construction Schedule to include review time for resubmission same as for initially allowed.

B. Shop Drawings and Product Data:
    1. Revise initial drawings or data, and resubmit as specified for the initial submittal.
    2. Indicate changes which have been made other than those requested by the Architect.

C. Samples: Submit new samples as required for initial submittal.

3.03 FINAL DISTRIBUTION

A. Distribute reproductions of Shop Drawings and copies of Product Data bearing Architect and consultant review stamps to:
    1. Job site file.
    2. Record documents file.
    3. Other concerned Contractors.
    4. Subcontractors.
    5. Suppliers and fabricators.
    6. Owner / Owner’s Project Manager.

B. Distribute samples carrying the Architect’s review stamp, as directed by Architect.

3.04 ARCHITECT'S REVIEW RESPONSIBILITIES

A. Reviewing is only for general conformance and compliance with Project design concept and Contract Documents. Any action shown is subject to requirements of Contract Documents. Contractor is responsible for:
    1. Dimensions (confirm and correlate at Project Site).
    2. Fabrication processes; construction techniques.
    3. Quantities, space requirements, coordination of work with that of other trades.

B. Architect’s review of separate items does not constitute review of assembly in which it functions.

C. Submission of Materials Safety Data Sheets (SDSs) is for Architect's information and use and will not be reviewed for completeness or appropriateness for use on Project Site.

D. Also refer to Section 01 33 10, Submittal Procedures, for Architect's review actions.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Coordinate work of trades and schedule elements of repair and alteration work by procedures and methods to expedite completion of the work.
2. Move items, which will interfere with the repair activities. Protect and reinstall after repair work is completed. Protect items and finishes not relocated. If windows and frames interfere with masonry restoration, remove, salvage, and deliver to Owner. Reinstallation is not required.

B. The tall single-story Boiler Building and stack were constructed in 1928. In addition to other requirements, Work of this Section shall be performed under the guidelines of the Secretary of the Interior's Standards for the Treatment of Historic Properties.
1. It is the intent of this Contract that:
a. Repair and replacement materials shall match remaining historic construction in all physical and visual aspects including material, form, color, texture and workmanship.
b. As much of the historic material as possible shall be saved.
c. Perform work using the gentlest methods available. Prevent damage to materials and finishes to remain.
d. Sound historical materials will not be put at risk due to the work of this Section.

C. In addition to demolition specified in Section 02 41 19, Selective Building Demolition, and that specifically indicated on Drawings, cut, move, or remove items necessary to provide access or to allow alterations and new work to proceed. Include such items as:
1. Removal of abandoned items and items serving no useful purpose, such as abandoned conduit, wiring, miscellaneous brackets, hardware, and the like. Do not remove historic equipment, if equipment is required in order to perform the work; review with Architect before removal. This includes but is not limited to historic elevator equipment and historic brewing equipment.
2. Removal of unsuitable or extraneous materials such as abandoned equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.
3. Cleaning of surfaces, and removal of surface finishes as needed to install new work and finishes.
4. Repair or removal of hazardous or unsanitary conditions.
5. Removal of interior surface of the chimney.

D. Do not cut existing structural elements without Architect's review and approval.

E. Related Sections:
1. Section 01 11 50 - Intent and Definitions of Language Used in This Manual
2. Section 01 35 43 - Hazardous Materials Discovery
3. Section 01 35 91 - Historic Treatment Procedures
4. Section 01 74 10 - Cleaning
5. Section 02 41 19 - Selective Building Demolition

1.02 DEFINITIONS

A. Refer to Section 01 11 50, Section 01 35 91, and Section 02 41 19.

1.03 SEQUENCE AND SCHEDULES

A. Schedule Work in sequence and according to Construction Schedule. Show:
   1. Each stage of alteration work, include dates and durations of work.
   2. Trades and subcontractors employed in each stage of alteration work.

1.04 ALTERATIONS, CUTTING AND PROTECTION

A. Trade Qualifications: Shall be “Specialist” as defined in Section 01 11 50, Intent and Definitions of Language Used in This Manual, and individual technical sections.
   1. Moving and removing as required shall be performed by those qualified to perform the work in a manner to cause least damage to each type of work and provide means of returning surfaces to appearance of new work.

B. Perform cutting and removals to remove minimum work necessary. Perform in manner to avoid damaging adjacent work.
   1. Where required, cut finish surfaces such as metals by methods to terminate surfaces in a straight line at a natural point of division. Do not overcut corners.

C. Protection: Protect and prevent damage to existing finishes, equipment, and adjacent work indicated to remain. Protect existing and new work from weather and extremes of temperature. Provide weather protection and waterproofing as needed to prevent damage to remaining existing work and to new work. Provide temporary shoring and supports.

D. Provide temporary enclosures, as required, to provide weather protection and to separate work areas from the areas of existing buildings.

PART 2 - PRODUCTS

2.01 SALVAGED MATERIALS

A. Same as specified in Section 02 41 19, Selective Building Demolition.

2.02 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

A. Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work, unless other materials are specified or accepted.

B. Generally Contract Documents will not define products or standards of workmanship present in existing construction. Determine products and workmanship by inspection and any necessary testing. Use existing as a sample of comparison.

C. Products: Provide products for patching, extending, or matching as necessary to make Work complete and consistent with identical standards of quality.

PART 3 - EXECUTION

3.01 PERFORMANCE

A. Patch and extend existing work using skilled mechanics capable of matching existing quality of workmanship. Quality of patched or extended work is required to be not less than that specified for new work.

B. Where installation of new work requires opening of some existing walls, repair these openings to match existing, except where noted otherwise.

1. Fill holes and voids which result from installation of new work, and from removal of existing materials required by this contract.
2. Patched areas shall match the materials, finishes, and levels adjacent; or shall be put in the proper condition to receive the finish indicated.

C. Unscheduled openings for new work that penetrate existing structure shall be coordinated with Architect prior to commencing the work.

D. Adjustments: Where required, patch surfaces with finish materials matching existing.
1. Where removal results in adjacent spaces becoming one, rework to provide smooth planes without breaks, steps, or bulkheads.
2. Where extreme change in plane of 2 inches or more occurs, request Architect's instructions for transition method required.

E. Damaged Surfaces: Patch and replace with matching material portions of existing finished surfaces found to be damaged, lifted, discolored, or showing other imperfections.
1. Provide adequate support of substrate prior to patching the finish.
2. Refinish patched portions of painted or coated surfaces; produce uniform color and texture over entire surface.
3. When existing surface finish cannot be matched, refinish entire surface to nearest intersections.

F. Transition from Existing to New Work: When new work abuts or finishes flush with existing work, make smooth and workmanlike transitions. Patched work is required to match existing adjacent work in texture and appearance. Patch or transition is required to be invisible at 10 feet.
1. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surfaces neatly along straight lines at natural division lines, and provide trim appropriate to finished surface as accepted by Architect.

3.02 CLEANING

A. Perform periodic and final cleaning as specified in Section 01 74 10, Cleaning.

B. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

C. At completion of alterations work in each area, provide final cleaning and return space to a condition suitable for use by Owner.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Procedure in the event unknown hazardous materials are encountered:
a. Immediately stop work and seal off the area.
b. Immediately report discovery to Owner.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements
2. Section 02 41 19 - Selective Building Demolition

1.02 ARCHITECT RESPONSIBILITY

A. Architect will not be responsible for the content of the hazardous materials abatement documents nor for the work done thereunder.
1. Architect will not be required to provide any service or render any opinions related to hazardous materials.

1.03 OWNER RESPONSIBILITY

A. The Owner will remove discovered toxic or hazardous chemicals or materials prior to construction activities resuming. Should there be any known hazardous materials left in the construction area, the Contractor will be informed by the Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 PROCEDURE

A. If materials suspected of being hazardous are encountered at the project site, immediately suspend work and notify the Owner and Architect.
1. Upon notification from the Contractor, the Owner will engage the services of an independent hazardous materials abatement contractor to identify and remove hazardous materials.
2. Upon notice of completion of the hazardous materials abatement work, the Contractor shall resume work.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Section includes general protection and treatment procedures for designated historic spaces and surfaces in the Project and the following specific work:
a. Historic removal and dismantling.

B. The tall single-story Boiler Building and stack were constructed in 1928. In addition to other requirements, Work of this Section shall be performed under the guidelines of the Secretary of the Interior's Standards for the Treatment of Historic Properties.
1. It is the intent of this Contract that:
a. Repair and replacement materials shall match remaining historic construction in all physical and visual aspects including material, form, color, texture and workmanship.
b. As much of the historic material as possible shall be saved.
c. Perform work using the gentlest methods available. Prevent damage to materials and finishes to remain.
d. Sound historical materials will not be put at risk due to the work of this Section.

C. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 02 41 19 - Selective Building Demolition: qualifications for specialist performing demolition, dismantling, salvaging and removal
3. Section 04 01 20.52 Masonry Cleaning: qualifications for cleaning specialist
4. Section 04 01 20.91 Masonry Restoration: qualifications for restoration specialist

1.02 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.

B. Dismantle: To disassemble and detach items by hand from existing construction to limits indicated, using small hand tools and small one-hand power tools, to protect nearby historic surfaces; and legally dispose of items off-site unless indicated to be salvaged or reinstalled.

C. Existing to Remain: Existing items that are not to be removed, dismantled or salvaged.

D. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as accepted by Architect.

E. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

H. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

I. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

J. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

K. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

L. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.

M. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

N. Retain: To keep existing items that are not to be removed or dismantled.

O. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.

P. Salvage: To carefully remove or dismantle items, protect and prevent damage to items, and store for future reinstallation on this project, or deliver to Owner ready for reuse.

Q. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; and to reestablish a weather-resistant enclosure.

R. Strip: To remove existing finish down to base material unless otherwise indicated.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the whole project Historic Treatment Plan, with Historic Restoration Plans required for work specified in other Sections, including restoration work and items to be dismantled, salvaged and storage for reinstallation or delivery to Owner.

B. Historic Treatment Preconstruction Conference: Conduct meeting to review methods and procedures related to historic treatment including, but not limited to, the following:
   1. Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and site vegetation.
   2. Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
   3. Review qualifications of personnel assigned to the work and assign duties.
   4. Review material application, work sequencing, tolerances, and required clearances.
   5. Review areas where existing construction is to remain and requires protection.
   6. Removal and Dismantling:
      a. Inspect and discuss condition of construction to be removed or dismantled.
      b. Review requirements of other work that relies on substrates exposed by removal and dismantling work.

C. Sequencing and Scheduling: Plan and execute the Work to meet construction schedule.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:

1. Historic Treatment Plan: Submit before work begins. Coordinate with restoration Sections.
2. Fire-Prevention Plan: Submit before work begins.
3. Historic Treatments Construction Schedule: Indicate for entire Project the following for each activity to be performed in historic spaces, and on historic surfaces:
   a. Detailed sequence of historic treatment work, with starting and ending dates, coordinated with Owners' requirements and other work in progress.
   b. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use. Do not use such equipment without Contractor's professional engineer's certification that the structure can support the imposed loadings without damage.
   c. Use of stairs.
4. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations. See Section 01 32 33, Photographic Documentation.
5. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged including description and precise location.
6. Qualifications Data: For historic removal and dismantling specialist.

1.05 QUALITY ASSURANCE

A. Historic Removal and Dismantling Specialist Qualifications: Removal and dismantling work shall be performed by qualified historic removal and dismantling specialist, with experience completing a minimum of 5 projects in the last 10 years similar in scope and complexity.

B. Historic Treatment Plan: Prepare a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Sections.
   1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
   2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.

D. Standards: Comply with ANSI/ASSE A10.6.

E. Material Ownership: Historic items, relics, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object indicated.

F. Mockups: Prepare mockups of historic treatment procedures to demonstrate aesthetic effects and to set quality standards for materials and execution as indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Salvaged Historic Materials to be Delivered to the Owner:

a. Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
b. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
c. Store items in a dry, secure area until delivery to Owner.
d. Transport items to Owner's storage area as designated by Owner.
e. Protect items from damage during transport and storage.

2. Salvaged Historic Materials to be Reinstalled:
   a. Repair and clean historic items as indicated and to functional condition for reuse.
   b. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
   c. Protect items from damage during transport and storage.
   d. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.
3. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.
4. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weathertight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.
   a. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
   b. Secure stored materials to protect from theft.

1.07 PROJECT SITE CONDITIONS

A. Existing Conditions:
   1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
   2. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

B. Conduct removal and dismantling work complying with requirements, including site access and use limits indicated on Drawings.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work. In accordance with Section 01 35 43, Hazardous Materials Discovery, if materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner; Owner will remove materials under a separate contract.
   1. In the case of asbestos, stop work in the area of potential hazard, shut off ventilating fans, and rope off area until the questionable material is identified. Resume work in the area of concern after safe working conditions are verified.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC and notification regulations of Authorities Having Jurisdiction (AHJ) before beginning removal and dismantling work. Comply with hauling and disposal regulations of AHJ.

2.02 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

A. Removal Equipment: Use only hand-held tools unless otherwise accepted by Architect on a case-by-case basis.
   1. Jack hammers and air hammers are not permitted.

B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise accepted by Architect on a case-by-case basis:
   1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
   2. Pry bars more than 18 inches long and hammers weighing more than 2 pounds not permitted for dismantling work.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
   1. Verify that affected utilities have been disconnected and capped.
   2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
   3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
   1. See Section 01 32 33, Photographic Documentation.

3.02 PROTECTION

A. Comply with temporary barrier requirements in Section 01 56 00, Temporary Barriers and Enclosures.

B. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.

C. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.
   1. Use only proven protection methods, appropriate to each area and surface being protected.
   2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
   3. Erect temporary protective covers over walkways and pedestrian and vehicular entrance and exit that shall remain in service during course of historic treatment work.
   4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
   5. Provide shoring, bracing, and supports as necessary; do not overload structural elements.
   6. Protect surfaces along haul routes from damage, wear, and staining.

D. Temporary Protection of Historic Materials:
   1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
   2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and accepted by Architect.

E. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

F. Utility and Communications Services:
   1. Notify Owner, Architect, AHJ, and entities owning or controlling wires, conduits, pipes, and other services affected by historic treatment work before commencing operations.
   2. Disconnect and cap pipes and services as required by AHJ, as required for the historic treatment work.
   3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities, in accordance with Section 01 51 00, Temporary Utilities.

G. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.
   1. Prevent solids such as stone or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
   2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.03 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

B. Cover adjacent surfaces with protective materials proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use waterproof, UV resistant, covering materials and masking agents that will not stain or leave residue on surfaces to which they are applied.
   1. Apply protective materials according to manufacturer's written instructions.
   2. Do not apply liquid masking agents or adhesives to painted or porous surfaces.
   3. When no longer needed, promptly remove protective materials staining.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize and collect alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.04 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:
   1. Comply with NFPA 241 requirements unless otherwise indicated.

2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
    a. If combustible material cannot be removed, provide fire blankets to cover such materials.
    b. Prohibit smoking by all persons within Project work and staging areas.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or highly combustible materials, including welding, torch-cutting, soldering, brazing, paint removal with heat, or other operations where open flames or implements utilizing high heat or combustible solvents and chemicals are anticipated:
    1. As far as practical, restrict heat-generating equipment to shop areas or outside the building.
    2. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
    3. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
    4. Prevent the spread of sparks and particles of hot metal.
    5. Fire Watch: Before working with heat-generating equipment or highly combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241.

C. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

3.05 GENERAL HISTORIC TREATMENT

A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.

B. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Architect.

C. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

D. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on Record Drawings.

3.06 HISTORIC REMOVAL AND DISMANTLING

A. General: Historic removal and dismantling specialist's field supervisors shall be present when removal and dismantling work begins and during its progress.

B. Perform work according to accepted mockup(s).
    1. Provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
    2. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.

3. Do not operate air compressors inside building, unless approved by Architect in each case.
4. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
5. Do not use explosives.

C. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.

D. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.

E. Removing and Dismantling Items on or near Historic Surfaces:
1. Use only dismantling tools and procedures within 12 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
2. Unfasten items to be removed, in the opposite order from which they were installed.
3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
4. Dismantle anchorages.

F. Anchorages:
1. Remove anchorages associated with removed items.
2. Dismantle anchorages associated with dismantled items.
3. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section specific to the historic surface being patched.

G. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Comply with laws, ordinances, rules, regulations and lawful orders as required and in conformance with Contract Documents. Keep building department, fire department, and other authorities completely informed of changes in the work in a timely manner. This includes contract modifications, amendments, additions, shop drawings, and the like, current as of Project Manual date.
2. Gain approvals as required for Owner occupancy within contract scheduling requirements.
3. Make adjustments and modifications as required to conform to ordinances, and regulations.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements
2. Section 01 57 19 - Environmental Protection Procedures

1.02 REGULATORY REQUIREMENTS

A. Referenced codes establish minimum requirement levels. Where provisions of various codes or standards conflict, the more stringent provisions govern. Promptly submit to Architect written notice of observed contract document variations from legal requirements.

B. Compliance requirements include, but are not limited to the most recent adopted edition of the following:
1. International Building Code (IBC), as amended and adopted by the City of Mercer Island, and the State of Washington, WAC Chapter 51-50.
2. International Fire Code
3. Washington State Energy Code (WSEC)
4. National Fire Protection Association (NFPA) Codes including, but not limited to the following:
   a. NFPA 10-2010 Standard for Portable Fire Extinguishers.
5. State of Washington, WAC Chapter 296-24, General Safety and Health Standards, Washington Industrial Safety and Health Act (WISHA).
6. State of Washington, WAC Chapter 296-305-06501, Safety Standards for Fire Fighters.
7. Rules and Regulations of the State Board of Health.
8. Department of Labor and Industries (L&I) Regulations: Hazard Communication Standards (SDS), WAC 296-62-054 through WAC 296-62-05427.
9. Environmental Requirements: Relevant statutes and regulations dealing with prevention of environmental pollution and preservation of public natural resources.
   a. Washington State Department of Ecology: Emission Standards and Controls For Sources Emitting Volatile Organic Compounds (VOC), WAC 173-490, 2/2.
   b. United States Environmental Protection Agency, National Volatile Organic Compound Emissions standards for Architectural Coatings, Federal Register/Vol. 63, No. 176//Rules and Regulations, Final Rule.
   c. Puget Sound Clean Air Agency (PSCAA).
10. City of Mercer Island Requirements:
    a. Municipal Code;
    b. Others, as applicable.
11. City of Mercer Island Fire Department regulations.
12. King County regulations as applicable.

C. Specifications of Higher Standards: Drawings and Specifications govern whenever Drawings and Specifications require higher standards than are required by governing codes, regulations, and the like.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Listing of applicable Reference Standards used in Contract Documents. These are indicated by acronym, full title, and postal and web address.

1.02 REFERENCE STANDARDS

A. The Contract Documents contain references to various standard specifications, codes, practices, and requirements for materials, equipment, work quality, installation, inspections, and tests, which references are published and issued by the organizations, societies, and associations listed herein by abbreviation and name. Such references are hereby made a part of the Contract Documents.

B. 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.

C. Whenever a referenced standard contains administrative requirements, including measurement and payment provisions, such as the standards specifications of various government entities, utility districts, and other agencies, such administrative requirements shall not apply to the Work of this Contract. References to such standards shall be applicable to the pertinent technical provisions only.

D. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. When required by individual Specification Section, obtain copy of standard, catalog or excerpt. Maintain copies at Project Site during submittals, planning, and progress of the specific work through final acceptance of the work by Owner. Make readily available for Architect and the Contractor's staff in carrying out quality assurance and quality control programs specified in the Contract Documents, and to assure compliance with the requirements of the codes, specifications, test methods, practices, and other standards referenced in the Contract Documents.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. The contractual relationship of the parties of the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.03 SCHEDULE OF REFERENCES

A. All listings may not be referenced in the Contract Documents.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. Listings may not be complete. Where not shown, request information from Architect during bidding.

D. Abbreviations and Acronyms for Industry Organizations, Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract

Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
AA	Aluminum Association (The)	www.aluminum.org
AAADM	American Association of Automatic Door Manufacture	www.aaadm.com
AABC	Associated Air Balance Council	www.aabc.com
AAMA	American Architectural Manufacturers Association	www.aamanet.org
AAN	American Association of Nurserymen (see ANLA)	
AASHTO	American Association of State Highway & Transportation Officials	www.transportation.org
ABAA	Air Barrier Association of America	www.airbarrier.org
ACI	American Concrete Institute	www.concrete.org
ACPA	American Concrete Pipe Association	www.concrete-pipe.org
ADAAG	Americans with Disabilities act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities	www.access-board.gov
AF&PA	American Forest & Paper Association	www.afandpa.org
AGA	American Galvanizers Association	www.galvanizeit.org
AGA	American Gas Association	www.aga.org
AGC	Associated General Contractors of America (The)	www.agc.org
AHA	American Hardboard Association (see AWC Composite Panel Association)	www.pbmdf.com
AI	Asphalt Institute Research	www.asphaltinstitute.org
AIA	American Institute of Architects	www.aia.org
AIA	American Insurance Association	www.aiadc.org
AIHA	American Industrial Hygiene Association	www.aiha.org
AIMA	Acoustical & Insulating Materials Association	
AISC	American Institute of Steel Construction	www.aisc.org
AISI	American Iron and Steel Institute	www.steel.org
AITC	American Institute of Timber Construction	www.aitc-glulam.org
ALSC	American Lumber Standards Committee	www.alsc.org

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
AMCA	Air Movement and Control Association International	www.amca.org
ANLA	American Nursery & Landscape Association	www.anla.org
ANSI	American National Standards Institute	www.ansi.org
AOAC	Association of Official Analytical Chemists Internatior	www.aoac.org
AOSA	Association of Official Seed Analysts, Inc.	www.aosaseed.com
APA/EWA	APA- The Engineered Wood Association	www.apawood.org
APAW	Asphalt Paving Association of Washington, Inc. (See WAPA)	
API	American Petroleum Institute	www.api.org
APWA	American Public Works Association: WA State Chapter (See WSDOT)	
ARRA	Asphalt Recycling & Reclaiming Associations	www.arra.org
ASA	American Subcontractor's Association	www.asaonline.com
ASA	American Standards Association	www.asaonline.com
ASCE	American Society of Civil Engineers	www.asce.org
ASHRAE	American Society of Heating, Refrigeration & Air-Conditioning Engineers, Inc.	www.ashrae.org
ASME	American Society of Mechanical Engineers	www.asme.org
ASNT	American Society for Nondestructive Testing	www.asnt.org
ASPA	American Sod Producers Association (see TPI)	
ASTM	American Society for Testing & Materials	www.astm.org
AWCI	Association of Wall and Ceiling Industries	www.awci.org
AWI	Architectural Woodwork Institute	www.awinet.org
AWPA	American Wood Protection Association	www.awpa.com
AWPI	American Wood Preservers Institute	www.awpi.org
AWS	American Welding Society	www.aws.org
AWS	Architectural Woodwork Standards Adopted and published jointly by AWI, AWMAC & WI	

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
AWMAC	Architectural Woodwork Manufacturers Assoc. of Ca	www.awmac.com
AWWA	American Water Works Association	www.awwa.org
BHMA	Builders Hardware Manufacturers Association	www.buildershardware.com
BIA	Brick Industry Association	www.bia.org
BSI	Building Stone Institute	www.buildingstoneinstitute.org
CDA	Copper Development Association, Inc.	www.copper.org
CE	Army Corp of Engineers	www.usace.army.mil
CFR	Code of Federal Regulations	www.gpoaccess.gov/cfr/index.html
CISCA	Ceilings and Interior Systems Construction Assoc.	www.cisca.org
CISPI	Cast Iron Soil Pipe Institute	www.cispi.org
CLFMI	Chain Link Fence Manufacturers Institute	www.chainlinkinfo.org
CPA	Composite Panel Association	www.pbmdf.com
CRI	The Carpet and Rug Institute	www.carpet-rug.org
CRRC	Cool Roof Rating Council	www.coolroofs.org
CRSI	Concrete Reinforcing Steel Institute	www.crsi.org
CSI	Construction Specifications Institute	www.csinet.org
CSSB	Cedar Shake and Shingle Bureau	www.cedarbureau.org
DASMA	Door & Access Systems Manufacturers Assoc.	www.dasma.com
DFPA	Douglas Fir Plywood Association (see APA)	
DHI	Door and Hardware Institute	www.dhi.org
DOC	Department of Commerce	www.doc.gov
DOE	Washington State Department of Ecology	www.ecy.wa.gov
DOH	Washington State Department of Health	www.doh.wa.gov
DOT	U.S. Department of Transportation	www.dot.gov
DSI	Dimensional Stone Institute (see MIA)	
EEI	Edison Electric Institute	www.eei.org
EIA	Electronic Industries Alliance	www.eia.org

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
EIMA	EIFS Industry Members Association	www.eima.com
EPA	Environmental Protection Agency Northwest Region (see also PSCAA)	www.epa.gov www.epa.gov/region10
FAA	Federal Aviation Administration	www.faa.gov
FCC	Federal Communications Commission	www.fcc.gov
FDA	Food and Drug Administration	www.fda.gov
FGMA	Flat Glass Marketing Association (see GANA)	
FM	Factory Mutual System (see FMG)	
FMG	FM Global Corporate Headquarters	www.fmglobal.com
FS	Federal Specification: Available from: - Department of Defense Single Stock Point - General Services Administration - National Institute of Building Sciences	 www.dodssp.daps.mil www.fss.gsa.gov www.nibs.org
FSC	Forest Stewardship Council	www.fsc.org
GA	Gypsum Association	www.gypsum.org
GANA	Glass Association of North America	www.glasswebsite.com
GS	Green Seal	www.greenseal.org
GSA	General Services Administration	www.gsa.gov
HMMA	See NAAMM	
HPVA	Hardwood Plywood & Veneer Association	www.hpva.org
IAPMO	International Association of Plumbing and Mechanical Officials	www.iapmo.org
ICBO	International Building Code for International Conference of Building Officials	www.icbo.org
ICC	International Code Council	www.intlcode.org
ICC-ES	ICC Evaluation Service, Inc.	www.icc-es.org
ICEA	Insulated Cable Engineers Association, Inc. (IPCEA Insulated Power Cable Engineers Assoc.)	www.icea.net
ICRI	International Concrete Repair Institute	www.icri.org
IEEE	Institute of Electrical and Electronic Engineers, Inc.	www.ieee.org
IESNA	Illuminating Engineering Society of North America	www.iesna.org

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
IGCC	Insulating Glass Certification Council	www.igcc.org
IGMA	Insulating Glass Manufacturers Alliance	www.igmaonline.org
ILI	Indiana Limestone Institute of America	www.iliai.com
IMSA	International Municipal Signal Association	www.imsasafety.org
IPC	International Plumbing Code	
IRI	Industrial Risk Insurers	www.industrialrisk.com
ISA	International Society of Arboriculture	www.isa-arbor.com
ISO	International Organization for Standardization	www.iso.org
LEED	Leadership in Energy and Environmental Design (See USGBC)	
MBMA	Metal Building Manufacturer's Association	www.mbma.com
MFMA	Maple Flooring Manufacturers Association, Inc.	www.maplefloor.org
MFMA	Metal Framing Manufacturer's Association	www.metalframingmfg.org
MIA	Marble Institute of America	www.marble-institute.com
MIA	Masonry Institute of America	www.masonryinstitute.org
MIL-STD	See MILSPEC	
MILSPEC	Military Standards and Specifications	www.dodssp.daps.dla.mil
MIW	Masonry Institute of Washington	www.masonryinstitute.com
ML/SFA	Metal Lath/Steel Framing Association (NAAMM)	www.naamm.org
MPI	Master Painters Institute	www.paintinfo.com
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.	www.mss-hq.org
NAAMM	National Association of Metal Manufacturers	www.naamm.org
NACE	NACE International (National Association of Corrosion Engineers International)	www.nace.org
NAIMA	North American Insulation Manufacturers Assoc.	www.naima.org
NBGQA	National Building Granite Quarries Association, Inc.	www.nbgqa.com
NCMA	National Concrete Masonry Association	www.ncma.org

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
NCRP	National Council on Radiation Protection & Measurements	www.ncrponline.org
NEBB	National Environmental Balancing Bureau	www.nebb.org
NEC	National Electrical Code	
NELMA	Northeastern Lumber Manufacturers Association	www.nelma.org
NEMA	National Electrical Manufacturers Association	www.nema.org
NETA	InterNational Electrical Testing Association	www.netaworld.org
NFPA	National Fire Protection Association	www.nfpa.org
NFPA	National Forest Products Association (see AFPA)	
NFRC	National Fenestration Rating Council	www.nfrc.org
NHLA	National Hardwood Lumber Association	www.nhla.com
NIBS	National Institute of Building Sciences	www.nibs.org
NIOSH	National Institute of Occupational Safety and Health - Dept of Health, Education and Welfare	www.cdc.gov/niosh
NIST	National Institute of Standards and Technology	www.nist.gov
NLGA	National Lumber Grades Authority	www.nlga.org
NOFMA	National Oak Flooring Manufacturers Association, Inc. (see NWFA)	
NRCA	National Roofing Contractors Association	www.nrca.net
NSF	NSF International	www.nsf.org
NTMA	National Terrazzo and Mosaic Association, Inc.	www.ntma.org
NWCMA	Northwest Concrete Masonry Association	www.nwcma.org
NWFA	National Wood Flooring Association	www.woodfloors.org
NWWDA	National Wood Window & Door Association (See WDMA)	
NWCB	Northwest Wall and Ceiling Bureau	www.nwcb.org
OSHA	Occupational Safety and Health Administration/US Department of Labor	www.osha.gov
PCA	Portland Cement Association	www.cement.org

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
PCI	Precast/Prestressed Concrete Institute	www.pci.org
PCI	Powder Coating Institute (The)	www.powdercoating.org
PDCA	Painting and Decorating Contractors of America	www.pdca.org
PDI	Plumbing & Drainage Institute	www.pdionline.org
PS	Product Standard of U.S. Department of Commerce Government Printing Office	
PSCAA	Puget Sound Clean Air Agency	www.pscleanair.org
PTI	Post-Tensioning Institute	www.post-tensioning.org
RFCI	Resilient Floor Covering Institute	www.rfci.com
RCSC	Research Council on Structural Connections (See AISC)	www.boltcouncil.org
SDCI	Seattle Department of Construction and Inspections	www.seattle.gov
SDI	Steel Deck Institute	www.sdi.org
SDI	Steel Door Institute	www.steeldoor.org
SIGMA	(See IGMA)	
SJI	Steel Joist Institute	www.steeljoist.org
SMACNA	Sheet Metal and Air-Conditioning Contractors' National Association	www.smacna.org
SPRI	Single Ply Roofing Industry	www.spri.org
SSINA	Specialty Steel Industry of North America	www.ssina.com
SSPC	Society for Protective Coatings (The)	www.sspc.org
STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Assoc.	www.steeltank.com
SWI	Steel Window Institute	www.steelwindows.com
TCNA	Tile Council of North America, Inc.	www.tileusa.com
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance	www.tiaonline.org
TIMA	Thermal Insulation Manufacturer's Assoc. (NAIMA)	
TMS	The Minerals, Metals and Materials Society (See ACI and ASCE)	www.tms.org
TPI	Turfgrass Producers International	www.turfgrassod.org

ACRONYM	ASSOCIATIONS & STANDARDS	WEBSITE
TSCA	Toxic Substances Control Act (see PSCAA)	
UFAS	Uniform Federal Accessibility Standards	www.access-board.gov
UL	Underwriters' Laboratories	www.ul.com
USDA	United States Department of Agriculture	www.usda.gov
USGBC	U.S. Green Building Council	www.usgbc.org
WABO	Washington Association of Building Officials	www.wabo.org
WAC	Washington Administrative Code	www.apps.leg.wa.gov/wac
WAPA	Washington Asphalt Pavement Association	www.asphaltwa.com
WCLIB	West Coast Lumber Inspection Bureau	www.wclib.org
WCSC	Window Covering Safety Council	www.windowcoverings.org
WDMA	Window & Door Manufacturers Association	www.wmda.com www.nwwda.org
WHI	Warnock Hersey Intertek	www.intertek-etlsemko.com
WI	Woodwork Institute	www.woodworkinstitute.com
WISHA	Washington Industrial Safety and Health Act	
WRCLA	Western Red Cedar Lumber Association	www.wrcla.org
WSDA	Washington State Department of Agriculture	www.wa.gov/agr
WSDOT	Washington State Department of Transportation Department of General Administration	www.wsdot.wa.gov/fasc
WSRCA	Western States Roofing Contractors Association	www.wsrca.com
WSTA	Western States Terrazzo Association	www.westernstatesterrazzo.com
WWPA	Western Wood Products Association	www.wwpa.org
WWPA	Woven Wire Products Association	www.wovenwire.org

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Quality Control System:
a. Establish and maintain an effective quality control system in compliance with these specifications. The Contractor Quality Control (CQC) system shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction, and operations, both on-site and off-site, that complies with contract requirements and is keyed with the construction schedule. Review and certify as correct and complete, and in compliance with contract requirements, shop drawings and lists of materials, fixtures, and equipment as required by technical specifications.
b. Quality Control is the sole responsibility of the Contractor. Quality Assurance is the responsibility of the Contractor.
c. Recurring Deficiencies: If recurring deficiencies indicate that the CQC System is not adequate, corrective action shall be taken as directed by Owner. Progress payments may be withheld until such corrective action has been completed.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures

1.02 DEFINITIONS

A. Definable Feature of Work: A “definable feature of work” is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there is frequently more than one definable feature under a particular section.

1.03 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples. Submittals include but are not limited to:
1. Qualifications: Resumes of Contractor's proposed Quality Control staff including on-site Quality Control Representative and inspectors.
2. Quality Control Plan.

1.04 CONTRACTOR'S QUALITY CONTROL SYSTEM

A. Coordination Meeting/Acceptance of Plan:
1. Before start of construction, meet with the Owner and Architect representatives to discuss the CQC Plan.
a. If requested by Contractor, this discussion can occur at the Preconstruction Meeting, as long as a Preliminary CQC Plan is submitted to the Owner and Architect for review, a minimum of 5 working days prior to the Meeting.
2. Acceptance of the CQC Plan is conditional and will be predicated on satisfactory performance during construction. The Architect shall be notified of any changes to the plan, and those changes are subject to review and acceptance by the Owner.

B. Contractor's Quality Control System – General:
1. The 3-phase inspection system shall include the following minimum requirements:

a. Preparatory Inspection: This shall be an integral part of pre-installation meeting for designated portion of work, as set forth in Section 01 31 19, Project Meetings, be performed prior to beginning any such work, and shall include:
   1) A review of applicable specifications.
   2) A review of the contract plans.
   3) A check to assure that all materials and/or equipment have been tested, submitted and approved.
   4) A check to assure that provisions have been made to provide control inspection and testing.
   5) Examination of the work area to assure that all required preliminary work has been completed and is in contract compliance.
   6) A physical examination of required materials, equipment and sample work to assure that they conform to approved Shop Drawings or submitted data and are properly stored.
   7) Discussion of procedures for constructing the work, including repetitive deficiencies, construction tolerances and workmanship standards specified in the documents.

b. Initial Inspection: This shall be performed as soon as work begins on a definable feature of work and the following shall be accomplished:
   1) A check of preliminary work to ensure that it is in contract compliance. Review of the preparatory meeting minutes.
   2) Verification of full contract compliance and verify required control inspection and testing is underway.
   3) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare work with sample panels, mock-ups and the like, as appropriate.
   4) Resolve all differences.
   5) This inspection phase should be repeated for new crew on site performing the work or any time standards are not being met.

c. Follow-Up Inspection: These shall be performed daily to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work.

2. Record Documents: Maintain full size marked-up drawings, survey notes, sketches, nameplate data, pricing information, description, and serial numbers of all installed equipment as well as other information depicting as-built conditions. This information shall be updated daily and be maintained in a current condition at all times until completion of work and shall be available for review by the Owner at all times. Upon completion of the work, this information shall be furnished to the Owner in conformance with requirements of Section 01 78 00, Closeout Submittals.
3. Tests: Operation and acceptance tests, where specified, shall be performed to verify control measures are adequate. These tests shall be documented and a copy shall be provided to the Owner upon completion.

C. Quality Control Program, Staffing:
1. Develop a Quality Control (CQC) program, describing lines of authority and acknowledgment that the CQC staff shall implement the inspection program. The Contractor's staff shall include an on-site Quality Control Site Representative, who shall report to the Project Manager or someone higher in the Contractor’s organization. Project Manager in this context shall mean the individual with responsibility for the overall management of the Project including quality and production, and shall be subject to approval by the Owner and Architect.
2. Contractor’s Quality Control Site Representative shall be on site at all times during progress of the work with complete authority to take action necessary to ensure compliance with Contract Documents. This includes authority to stop work, if needed. Additional staff, if needed, for CQC program shall be at a satisfactory level as required to perform activities outlined in this Section, subject of Architect’s approval.

3. Submit full resumes giving experience and qualifications of all personnel proposed for Contractor's CQC program. Owner and Architect shall reserve the right to reject any person proposed for Contractor's CQC organization based on Owner's and Architect's review of each resume.
4. Submit resume(s) of proposed inspector(s) showing their experience and qualifications for the proposed inspection activities. Experience must be of the same type as will be required for this project.

D. Contractor's Quality Control Plan: Submit a quality control plan to the Architect for review prior to the start of construction. Allow 10 working days after receipt in the Architect's office for CQC plan review and comments. The plan shall include the following elements:
1. A statement of how the plan will operate and a supporting organization chart to show the individual on the Contractor's staff responsible for implementing and controlling the plan and staffing of the testing and inspection activities.
2. Identification of the Contractor Quality Control Site Representative as described above.
3. A staffing plan for Contractor inspectors which is consistent with the scope and Construction Schedule for the project.
4. Identification of inspector(s) as described above.
5. A coordination plan showing how the efforts of the Contractor's quality control staff will be coordinated with the Architect, retained special inspectors, and engineers.
6. Procedures for scheduling, reviewing, certifying and managing submittals.
7. Methods to be used for documenting the 3 phase inspection system.
8. Procedures for tracking construction deficiencies from identification through corrective action and for verification that deficiencies have been corrected.
9. Copy of Contractor's Quality Control Daily Report shall be documented on mutually agreed upon forms and a copy shall be provided to the Owner upon completion. Report shall include entries for identifying weather conditions (temperature, dry, wet, amount of rain), trade activities (classification of workers within the trade, staffing number for each trade, what work trade was performing on the project), equipment on site (rented and contractor owned, what equipment was being used for each day), important communications with Architect, Owner, Inspectors, Supplier or specific Trade, factual record containing specification reference for the work being performed, and quality control activities. The report shall include entries for the Quality Control Representative's signature certifying that all materials and supplies incorporated into the work are in compliance with the Contract Documents and Architect approved modifications. This report will not be accepted as the daily quality control report unless it also incorporates the specific requirements of this Section.
10. Copy of inspection form for different activities that will be inspected, including those listed in Section 01 45 23, Testing and Inspection Services, and on Structural General Notes.
    a. Prepare inspection forms with check-off items for key construction elements to be signed off by Contractor's inspectors and reviewed from time to time by the Architect.
11. Include procedure for tracking and inspecting "As-Built" plans in Quality Control Plan.

E. Contractor's Pre-Installation Quality Control:
1. Well in advance of the installation of every major unit of work, which requires coordination with other work, ensure that the unit of work can be installed and function as intended and required in conjunction with other work which has preceded or will follow. In the event of conflict, determine corrective action required, inform the Architect, and proceed with the Architect's concurrence.
2. See Section 01 61 00, Basic Product Requirements, for further requirements.
3. Perform inspection of products and equipment immediately following delivery to site to determine conformance with the Contract Documents and any evidence of damage.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, both on and off-site to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

3.02 TOLERANCES

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of the highest quality.

B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust Products to appropriate dimensions, position before securing Products in place.

3.03 REFERENCES AND STANDARDS

A. For products and workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards and instructions where required by product specification sections.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference documents.

E. Assure manufacturer's instructions are adhered to obtain specified warranties.

3.04 MOCK-UPS AND FIELD INSTALLATIONS

A. Mock-Ups and Field Installations: Perform work under provisions identified in Section 01 43 39, Mock-Up Requirements, and identified in the respective product Specification Sections.
   1. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

3.05 MANUFACTURERS

A. Manufacturer's Certificates: When required by individual Specification Sections, submit manufacturers' certificate, that products meet or exceed specified requirements.

B. Manufacturer's Field Services: When specified in respective Specification Sections, require supplier and manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.
   1. Representative shall submit written report to Architect listing observations and recommendations. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

3.06 REPORTING

A. Maintain a daily record of all inspections and tests performed for each shift of subcontractor operations in an appropriate format. These records shall provide factual evidence that continuous quality control inspections and tests have been performed, including any defects, causes for rejection, proposed remedial action and corrective actions taken.

3.07 TRANSMITTAL OF DOCUMENTATION

A. Submit copies of previous weeks Contractor's hand-written Contractor Quality Control Daily Reports and Contractor's Quality Control Test Report forms to the Architect and Owner in electronic format via email, and bring a hard copy to each bi-monthly progress meeting.

B. Prior to Substantial Completion, coordinate with special inspection and request letter of compliance for respective testing firms.

3.08 NON-COMPLIANCE NOTICE (NCN)

A. The Owner will notify the Contractor of any detected non-compliance with the foregoing requirements. If, after such notice, the Contractor fails to correct such non-compliant work, an NCN shall be issued. Such notice, when delivered to the Contractor at the Project Site, shall be deemed sufficient for the purpose of notification.

B. Upon receipt of the NCN, take immediate action to correct work. Review corrections at progress meetings for non-compliant work.

C. If Contractor fails or refuses to take corrective action to comply promptly, Owner may issue an order stopping all or part of work until satisfactory corrective CQC action has been taken. Progress payments may be withheld until such corrective action has been completed.

D. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Erection of field samples and mock-ups at the project site in locations acceptable to the Architect.
2. Construct each sample or mock-up complete, including work of all trades required in finished work.

B. Related Sections:
1. See individual specification sections.

1.02 DESCRIPTION

A. Mock-ups and Field Samples:
1. Full-size, physical assemblies that are constructed on-site.
2. Used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
3. Made in the field to demonstrate finishes, textures, colors, and the like for Architect's selections and approvals. Mock-ups and Field Samples are described in the technical specification sections and may include several types of finishes, textures, colors and the like to be applied at one time. Architect may request additional field samples until required finish, texture, color and the like has been selected.

1.03 MOCK-UPS AND FIELD SAMPLES

A. Before installing portions of the Work requiring mock-ups and field samples, build mock-ups and field samples for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mock-ups and field samples in location and of size indicated or, if not indicated, as directed by Architect.
2. Assemble and erect mock-ups with specified attachment and anchorage devices, flashings, seals, and finishes.
3. Tests on mock-ups, if required, will be performed under provisions identified in the respective product specification section.
4. Notify Architect 7 days in advance of dates and times when mock-ups and field samples will be constructed.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mock-ups and field samples before starting work, fabrication, or construction.
7. Allow 7 days for initial review and each re-review of each mock-up and field sample.
8. Maintain mock-ups and field samples during construction in an undisturbed condition as a standard for judging the completed Work.

B. Re-construct/Re-erect/Re-apply mock-up/field samples as required until accepted by Architect.

C. Where mock-up or field sample has been approved by Architect and is specified in product specification sections to be removed; remove mock-up or field sample and clear area when directed to do so. Unless otherwise directed, maintain mock-ups until completion of the project. Protect mock-up from weather, damage and vandalism.

D. Approved mockups establish the standard of quality by which the Work will be judged.

E. Independent mock-ups shall remain the property of the Owner, unless otherwise indicated.

PART 2 - PRODUCTS

2.01 MOCK-UPS AND FIELD SAMPLES

A. Brick and stone cleaning specified in Section 04 01 20.52.

B. Water repellent and graffiti-resistant coatings, specified in Section 07 19 00.

C. Refer to individual specification sections and project Drawings for mock-ups and field samples requirements. Provide mock-ups prior to cleaning and coating.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Cooperate with Testing Laboratories and Independent Inspection Agencies, employed by Owner including but not limited to the following:
a. Inspection and testing required by laws, ordinances, rules, regulations, orders, or approvals of public authorities for all phases of the work.
b. On-site monitoring and Laboratory and Field tests required;
c. See requirements specified this Section, other Specification Sections throughout the Project Manual, and Structural General Notes on Drawings.
2. Contractor shall pay for re-testing of non-conforming work.

B. Related Sections:
1. Section 01 41 00 - Regulatory Requirements
2. Section 01 43 00 - Quality Requirements

1.02 INSPECTION AND TESTING PROVIDED UNDER OTHER SECTIONS

A. Certification of products; the respective sections of Specifications.

B. Testing of systems and components that are not included under testing laboratory services.

1.03 REFERENCE STANDARDS AND CODES

A. Codes: Conform to the requirements of the individual Specification Sections, current adopted edition of International Building Code with City of Mercer Island amendments, local City of Mercer Island ordinances, WSDOT Standard Specifications for applicable work, and other applicable codes. See also, Section 01 41 00, Regulatory Requirements.

B. Standards: Conform to requirements of applicable provisions of the most recent adopted editions of referenced standards as listed in the individual Specification Sections and referenced herein. See also, Section 01 42 00, Reference Standards.

1.04 PROCEDURES

A. Owner will employ and pay for an Independent Testing Laboratory or Laboratories to perform specified monitoring and testing services.
1. Contractor's cooperation with the Independent Testing Laboratory is required to facilitate their required services.
2. Employment of an Independent Testing Laboratory does not relieve Contractor's obligations to perform Contract work.

B. Taking Specimens: Specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; sampling equipment and personnel will be provided by the testing laboratory; and deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

C. Schedules for Testing: By advance discussion with testing laboratory determine time required for laboratory performance and issuance of its findings. In scheduling tests, take into account advance notice time to Owner and Architect.
1. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate such changes with testing laboratory.

1.05 QUALITY ASSURANCE

A. Inspecting: Comply with IBC, Chapter 17, “Structural Tests and Inspections,” and testing and inspection requirements as specified this Section.

B. Qualifications: Where independent Inspection and Testing Agency is employed by the Contractor, select an agency acceptable to the Building Code Official and the Owner.

1.06 DUTIES OF INDEPENDENT TESTING LABORATORIES

A. Independent Testing Laboratory will perform following services:
   1. Obtain and handle samples at Project Site or at source of product to be tested.
   2. Promptly submit written report of each test and site visit; one copy each to Architect, Architect's Structural Engineer, Contractor, Owner, and one copy to Record Documents File unless otherwise directed. Immediately report to all above, non-compliance. Submit a handwritten copy directly to Owner and Architect of observation reports, site visits and inspection reports prior to leaving the site on the day of the inspection. Include in each report, as appropriate:
      a. Date issued.
      b. Project title and number.
      c. Testing laboratory or engineering firm name, address, and telephone number.
      d. Name and signature of representative.
      e. Date and time of sampling of site visit.
      f. Record of weather conditions.
      g. Date of test.
      h. Identification of product and Specification Section.
      i. Location of sample or test in the project.
      j. Type of inspection verification or test.
      k. Results of tests and compliance with Contract Documents.
      l. Interpretation of test results, when requested by Owner, Architect or Structural Engineer.
   3. Furnish copies of each test report, as follows:
      a. Make reports as soon as practicable.
      b. Email copies of reports to:
         1) Owner;
         2) Architect;
         3) Architect's Structural Engineer;
         4) Contractor.
   4. Perform additional tests as required by Architect, Structural Engineer, or Owner.
      a. Cost of additional testing that shows Contractor’s non-compliance with the Contract Documents shall be paid by the Contractor.

B. Limitations Of Authority of Independent Testing Laboratory
   1. Laboratory is not authorized to do the following:
      a. Release, revoke, alter, or enlarge on requirements of Contracts Documents;
      b. Approve or accept any portion of the work;
      c. Perform duties of Contractor.
      d. Approve or authorize additional work.

1.07 CONTRACTOR’S RESPONSIBILITIES

A. Cooperate with engineering and laboratory personnel; provide access to work, and to Manufacturer’s operations.

B. Provide materials requiring control by testing laboratory.

C. Furnish incidental labor and facilities required to do the following:
   1. Provide access to work to be tested;
   2. Obtain and handle samples at the Project Site or at source of product tested;
   3. Facilitate inspections and tests; and
   4. Provide for storage and curing of test samples.

D. Notify laboratory sufficiently in advance of operations (not less than 48 hours) to allow for laboratory assignment of personnel and scheduling of tests.
   1. When tests or inspections cannot be performed after such notice, pay for laboratory personnel and travel expenses incurred due to Contractor's negligence at no additional cost to Contract.

E. Employ and pay for services of separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required.
   1. For Contractor's convenience.
   2. When initial tests indicated work does not comply with Contract Documents.

F. Provide a copy of the handwritten report to the Owner and Architect on site prior to leaving the site each day.

1.08 OWNER'S INSPECTIONS

A. Owner may perform inspections, including but not limited to following:
   1. Roofing and waterproofing inspections.

1.09 TESTS, INSPECTIONS, AND METHODS REQUIRED

A. Codes and Standards: Testing, when required, shall be in accordance with pertinent and referenced Codes and regulations and with selected standards of ASTM and ACI.

B. Concrete:
   1. Continuous Field Inspection: Owner's Testing Agency shall be present at all times during the placing of structural, reinforced concrete.
      a. Contractor shall provide brand and type of cement and sources of aggregates in time for Testing Agency sampling and testing.
   2. Concrete Formwork: Prior to placement of concrete, check condition of bond surfaces, locations and sizes of embedment items, and anchorage for prevention of displacement.
   3. Reinforcing Steel: Prior to placing of reinforcing steel, verify that reinforcing complies with requirements noted in Structural General Notes on Structural Drawings. Also verify grade, size and placement of reinforcing steel, welded wire reinforcement, and embedded items prior to placing concrete. Check condition of reinforcing and embedded items for bond integrity with concrete.
   4. Concrete Sampling and Testing:
      a. Batch Plant Inspection;
      b. Water: Test water in accordance with ASTM C94;
      c. Aggregates: Test aggregates in accordance with ASTM C33.
      d. Test Samples: 3 concrete test cylinders for each 100 cubic yards of each class of concrete placed; and one slump test for each set of test cylinders. Concrete test specimen shall be taken from concrete directly exiting chute of truck delivering the concrete. Tested for:
         1) Strength, in accordance with ACI 214.
         2) Air Content
         3) Slump, in accordance with ASTM C143.
      e. Concrete Drying Shrinkage Test Samples: Make, store, dry and measure specimens in accordance with ASTM C157. Measure after 7, 14, 21, and 28

days of drying, after 7 days of moist curing; average shrinking after 28 days shall not exceed 0.04 percent.

f. Concrete work evaluated by structural analysis or by results of a load test and found deficient shall be corrected in manner satisfactory to Owner and Architect.

g. All investigations, testing, load tests, and correction of deficiencies shall be performed, and approved by the Owner and/or Architect, at the expense of the Contractor.

C. Masonry: Helical anchor installation and mortar, as required by IBC.

D. Structural Steel:
1. Contractor shall provide mill certificates to testing and inspection agency;
2. Owner's Testing Agency shall verify at fabricator's plant that materials used match the mill tests or affidavits of test reports, that fabrication, welding procedures, surface preparation meet specifications; and then visually check fabricated steel delivered to the job site for compliance.
3. Owner's Testing Agency shall be present at all times during steel erection.
4. Bolting: Inspections shall conform to the requirements of Specification for Structural Joints Using ASTM A325 or A490 Bolts.
   a. For connection using high–strength tension control bolts, the Owners Testing Agency need not be present during the entire installation and tightening operation, provided the Testing Agency provides the following:
      1) Inspection of the surface and bolt type for conformance to plans and specifications prior to the start of bolting.
      2) Visual inspection of 100 percent of the high-strength bolts for properly installed tension.

E. Welding:
1. General:
   a. Verify conformance with requirements in Division 05 Sections.
   b. Provide experienced supervision of all elements of the work of this section.
   c. Engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
2. Inspection:
   a. In addition to the tests prescribed in this section, the Owner and/or Architect reserve the right to require the Testing Agency to make additional tests and inspections they may deem necessary to ensure compliance with specifications.
   b. Fabricator shall provide testing laboratory coupons from shop stock where and when designated by building inspector, Owner, or Architect for sampling purposes.
3. Welding Inspections: Shop and field welding shall be subject to inspection by a qualified welding inspector. To determine the quality of welds, the welding inspector may utilize X- or gamma-ray tests, ultrasonic testing, magnetic particle inspection, and any other aid to visual inspection which the inspector may deem necessary to assure him/herself of the adequacy of the welding.
4. Welds to be Inspected: Following welds shall be inspected by the methods indicated:
   a. Complete and partial penetration welds, 100 percent shall be checked by radiographic or ultrasonic testing.
   b. Fillet and other remaining welds at each story shall be visually inspected.
   c. Where radiographic testing is performed, it shall consist of one spot test per weld. When a spot radiographic test shows defects that require repair, the remainder of what weld shall be radiographed at the expense of the Contractor. Each 6-inch increment of weld or fraction thereof shall be considered one weld.
   d. Where ultrasonic testing is performed, the entire weld shall be tested.

5. Standards of Acceptance: Welds tested by radiographic and ultrasonic methods shall be accepted or rejected in accordance with ANSI/AWS D1.1.
6. Defective Welds: Welds found defective and repaired shall be reinspected by same methods originally used and this reinspection shall be paid for by the Contractor.
7. Additional Testing for Defective Welds: On the basis of welds found defective, the following additional welds shall be tested, and the testing shall be paid for by the Contractor. Added inspection shall be by the same methods originally used.
    a. If less than 5 percent of the welds tested by any method at each story are found defective, test one additional weld of that story.
    b. If 5 percent to 10 percent of the welds tested by any method at each story are found defective, test 50 percent of the remaining welds of that story.
    c. If over 10 percent of the welds tested by any method at each story are found defective, test all of the remaining welds at that story.
    d. Repair defects found, including preparation of the design of repair methods suitable to the Architect, including costs of the repair itself, and inspection of the repaired area.

F. Steel Decking: Owner's Testing Agency shall provide periodic inspection for field attachment of steel floor decking; and shall check and verify welding, attachment, and location of all closures and accessories.

G. Miscellaneous Metal: Where miscellaneous angles, channels, studs, and similar shapes are detailed for support of major components of the Work, the welds, bolts, and material are subject to the same testing equipment as other structural supporting members.

H. Other:
1. Consult other sections of Specifications and Structural General Notes for conformance with other indicated requirements of related work.
2. Special Cases: As determined by Building Code Official or as requested by Architect.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Temporary utilities required for construction. Include installation of extensions and branching, as required.
2. Make service connections to existing services in approved manner, in accordance with code requirements, and with prior approval of Owner.
3. Maintain and protect temporary utilities.
4. Service outages: Coordinate utility shutdowns with Owner, if needed.
5. Requirements by City of Mercer Island and Fire Protection Officials.
6. Removal of temporary utilities after completion of work.

1.02 REFERENCES AND STANDARDS

A. Applicable provisions of the most recent edition of the following standards shall apply to the work of this Section, except as modified herein, and are hereby made a part of these Specifications to the extent required:

ANSI A10 Series	Safety Requirements in Construction and Demolition Operations
ANSI A10.10	Safety Requirements for Temporary and Portable Space Heating Devices and Equipment
NFPA 241	Safeguarding Construction, Alteration, and Demolition Operations

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: In accordance with Section 01 41 00, Regulatory Requirements, comply with the following:
1. Rules and recommendations of utility companies.
2. Applicable local industry standards for construction work (published recommendations by local “building departments or councils”).
3. Applicable provisions of ANSI-A10 Series standards on construction safety.
4. NFPA 241.
5. Conserving Energy Material: Install and operate temporary facilities and perform construction activities in manner to conserve and avoid waste of materials, energy, and water.
6. Health and Safety regulations including OSHA and WISHA.
7. Environmental protection regulations.
8. Local Authorities Having Jurisdiction.
9. Local agencies and Fire Department as applicable.

B. Arrange for Authorities Having Jurisdiction (AHJ) to inspect and test each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.01 TEMPORARY SERVICES

A. General:
1. Required services include, but are not limited to water, toilet facilities, electrical power, and communications.
2. Comply with service companies’ recommendations for materials and methods, or engage service companies to install services.

3. Coordinate with Authorities Having Jurisdiction.

B. Keep temporary services and facilities clean and neat in appearance. Materials may be new or used, but are required to be of adequate capacity for usage.

C. Temporary utilities shall be safe, non-hazardous, and sanitary. Do not use materials constituting unsafe conditions, or that violate applicable codes and standards. Operate in a safe and efficient manner. Do not overload facilities. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

D. Locate and relocate services (as necessary) to minimize interference with construction operations. Adjust temporary utilities as required.

E. Pay costs for installation, maintenance, and removal of temporary services unless otherwise indicated.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Electric Power Service: Provide generator(s) for all electrical requirements including 24-hour illumination and security . Make all necessary arrangements for temporary electrical service for construction purposes.
1. Coordinate with Authorities Having Jurisdiction and obtain and pay for related permits.
2. When required for complete shutdowns such as outages during service changeovers, supply materials and equipment for temporary power including but not limited to, generators, temporary power drops or other service as needed.
3. Furnish, install and maintain circuit and branch wiring, with area distribution boxes located so that electricity is available for power and lighting throughout the construction by the use of construction type power cords. Install and maintain temporary equipment in accordance with applicable safety regulations.

B. Temporary Lighting: Provide adequate artificial lighting for:
1. Work areas where natural light is not adequate for work. Provide 5 footcandle minimum, unless higher is required by code; increase footcandle for painting and interior fine finish work. Permanent lighting equipment may be used provided that any damaged components are replaced, and that all components are cleaned prior to final acceptance of the project.
2. Areas of public access;
3. Security/night-time illumination.
4. Where construction interrupts existing lighting, provide temporary lighting as required.

C. Pay costs for installation, maintenance, and removal of temporary power and lighting.

2.03 TEMPORARY TELEPHONE/E-MAIL

A. Temporary Telephone and Internet Access: Make all necessary arrangements for temporary telephone and email services for construction purposes throughout construction period for common-use facilities:
1. Provide cell phone service; verify carrier coverage throughout work site. Cell phone service accepted in field office if has answering service.
2. Provide superintendent with cell phone for use when away from field office.
3. Provide voice-mail answering service on superintendent's telephone.
4. Provide internet service for computers in each field office.

B. Post a list of important emergency telephone numbers at field office and at each telephone. See Section 01 31 13, Project Communication and Coordination.

C. *Pay costs for telephone and internet service, installations, maintenance, and removals*.

2.04 TEMPORARY WATER

A. Temporary Water: Water service provided by Owner. Make all necessary arrangements for temporary water for construction purposes.
   1. Install connections, branch piping, and extensions of services as required for construction operations; include appropriate pressure-reducing stations. Locate taps so water is available throughout the Project by use of hoses. Protect piping and fittings against freezing.

B. Drinking Water: Provide drinking water from a proven safe source for all those connected with the Work. Pipe or transport water in such a manner as to keep it clean and fresh. Serve in single service containers or sanitary drinking fountains.

2.05 TEMPORARY SANITARY FACILITIES

A. Temporary Sanitary Facilities: Make all necessary arrangements for temporary sanitary facilities in compliance with laws and regulations.
   1. Provide and maintain adequate chemical toilet facilities for individuals connected with the Work, with separate facilities for men and women.
   2. Service, clean, and maintain facilities and enclosures.
   3. Comply with rules and regulations of OSHA and the Thurston County Health Department.
   4. Do not use permanent plumbing fixtures.

B. Pay costs for installation, maintenance, and removal of temporary sanitary facilities.

2.06 TEMPORARY FIRE PROTECTION

A. 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.

B. Develop and supervise an overall fire-prevention and fire-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.

C. Provide fire extinguishers, visible and accessible from space being served, with sign mounted above, where convenient and effective for their intended purpose including field office.

D. Store combustible materials in containers in fire-safe locations.

E. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of Authorities Having Jurisdiction (AHJ).

F. Pay costs for installation, maintenance, and removal of temporary fire protection.

PART 3 - EXECUTION

3.01 GENERAL

A. Maintain, operate, modify, and extend systems as work progress requires. Assure continuous services. Verify termination/removals with Architect.

3.02 REMOVAL

A. Completely remove temporary materials and equipment when no longer required.
   1. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
   2. Clean and repair damages caused by temporary installations and use of temporary facilities.
   3. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.
   4. Disinfect premises occupied by temporary sanitary facilities.
   5. Prior to Final Inspections, install new lamps in existing fixtures used for construction.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Furnish, install, maintain, and remove required construction facilities: Provide the following in accordance with requirements for each Phase:
   1. Construction aids.
   2. Temporary controls:
      a. Provide and maintain controls using methods, equipment, and temporary construction.
      b. Protect against unfavorable controls over environmental and other Project Site conditions and related areas under Contractor's management. Remove physical evidence of temporary control facilities at completion of Work.
      c. Protect adjacent buildings and site outside of Project area.
      d. Coordinate with project phasing.
      e. Protect existing utilities to remain both on-site and off-site.
      f. Include control provisions for:
         1) Dust.
         2) Water.
         3) Debris: Cleaning during construction is specified in Section 01 74 10 and Section 01 74 19.
         4) Pollution
         5) Erosion and sediment.
         6) Protection of work
         7) Noise
         8) Fumes (i.e., paints and coatings, exhausts)
         9) Tree and plant protection.
         10) Others, as required
   3. Field offices and sheds.
   4. Staging area.
   5. Vehicular access and parking.
      a. Traffic control: Follow requirements of City of Mercer Island traffic control manual.
         1) Provide, operate, and maintain equipment, services, and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow on access roads, haul routes, at site entrances, and at parking.
         2) Provide flares and lights during periods of low visibility.
         3) Prevent mud from impacting thoroughfares and highways.
         4) Minimize interference with normal public traffic.
         5) Maintain fire hydrants/water control valves free from obstruction.
      b. Parking control.
      c. Access roads.
   6. Removal of temporary equipment and facilities when no longer required. Restoration of grounds to original, or to specified conditions. Repair or replacement of existing paving damaged during Work of this Contract.
   7. Safety of the public.

B. Related Sections:
   1. Section 01 11 00 - Summary of Work: Contractor’s use of premises
   2. Section 01 51 00 - Temporary Utilities
   3. Section 01 56 00 - Temporary Barriers and Enclosures
   4. Section 01 57 19 - Environmental Protection Procedures
   5. Section 01 74 10 - Cleaning: debris control
   6. Section 01 74 19 - Construction Waste Management

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with codes, ordinances, regulations, and the like. See also, Section 01 41 00, Regulatory Requirements.
   1. Where applicable, conform to requirements of state and local air pollution control agency, and other authorities' rules and regulations.
   2. Comply with applicable authorities' requirements including those of local utility companies.
   3. Comply with applicable provisions of ANSI-Series standards on construction safety, including A10.3, A10.4, A10.5, A10.6, A10.7, A10.8, A10.9, A10.10, A10.11, A10.12, A10.13, A10.14, A10.15, A10.17, A10.18, A10.20, and A10.22.

PART 2 - PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS – GENERAL

A. Materials equipment and furnishings may be new or used.
   1. Materials shall be suitable for intended purposes.
   2. Materials shall be in conformance with governing codes, ordinances, and standards.

2.02 CONSTRUCTION AIDS

A. Provide construction aids, equipment and operating personnel as required to facilitate execution of work.
   1. Include scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, protective enclosures, silt fences, and other such facilities and equipment.

B. Maintain facilities and equipment in a first-class condition.

2.03 TEMPORARY BUILDING ENCLOSURES

A. Provide temporary weathertight enclosure of exterior walls for successive areas of the building as work progresses to assure:
   1. Acceptable working conditions.
   2. Weather protection for interior materials.
   3. Effective temporary heating.
   4. Prevention of entry/unauthorized persons, and the like. Provide temporary exterior doors with padlocks.
   5. Provide other enclosures as required. Construct to be removable to facilitate work and handling of materials.

B. Provide other protective enclosures as required or indicated. Construct protective enclosures to be removable to facilitate work and handling of materials.

PART 3 - EXECUTION

3.01 CONSTRUCTION AIDS

A. Review site conditions and factors affecting construction procedures and construction aids, including adjacent properties and public facilities affected by execution of work.

B. Relocate construction aids as required by construction progress; storage requirements; or accommodation of any other contractors employed at site.

3.02 TEMPORARY CONTROLS

A. Dust Control:
   1. Provide positive methods and apply dust control materials to minimize raising dust from construction operations. Prevent air-borne dust from dispersing into adjacent facilities and the atmosphere.
   2. Block out and/or cover HVAC ducts, enclosures, voids and the like during construction to ensure no dust or fume accumulation.

B. Water Control:
   1. Provide methods to control surface water and underground water. Prevent damage to Project, site, and adjoining properties.
   2. Provide, operate, and maintain hydraulic equipment of adequate capacity to control water.
   3. Dispose of drainage water in a manner to prevent flooding, and other damage to any portion of the building, site or adjoining properties.

C. Pollution Control: In accordance with the following:
   1. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere. Allow no discharge of noxious substances or fumes from construction operations.
   2. Provide equipment and personnel; perform emergency measures required to contain spillages. Remove contaminated soils and liquids.
      a. Excavate and dispose of earth contaminated by Contractor operations off-site in compliance with laws and regulations.
      b. Replace with suitable compacted fill and topsoil. Provide Owner with receipt of soil acceptability prior to installation.
   3. Take special measures to prevent harmful substances from entering public waters.
      a. Prevent disposal of wastes, effluents, chemicals, or other such substances in or adjacent to bodies of water, or in sanitary or storm sewers.
   4. Provide systems for control of atmospheric pollutants in accordance with Federal/State/Local published rules and regulations.
      a. Prevent toxic concentrations of chemicals.
      b. Prevent harmful dispersal of pollutants into the atmosphere or building HVAC systems in the adjacent surrounding buildings.

D. Provide temporary protection measures for tower and adjacent existing facilities during demolition and new construction activities associated with the Project.
   1. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
      a. Prohibit traffic or storage upon waterproofed or roofed surfaces.

E. Refer to Section 01 57 19 Environmental Protection Procedures for additional requirements.

3.03 FIELD OFFICES AND SHEDS

A. General Requirements:
   1. Prior to installation of offices and sheds, consult with Owner on locations, access, and related facilities. Coordinate with Contract drawings.
   2. Cleanliness: Keep clean and in good order.

B. Contractor’s Offices and Facilities:
   1. Construction: Structurally sound, insulated, weather tight, and air-conditioned field office for use as a common facility by personnel engaged in construction activities.
      a. At Contractor’s option, portable or mobile buildings may be used.

b. Size: As required for general use; and to provide separate space for Project Meetings; provide table and chairs for 12 attendees.
c. Photocopier: Copier with capability to provide 11 inch x 17 inch full size copies.

2. Other Furnishings:
   a. One 10-inch outdoor-type thermometer;
   b. Safety bulletin board for hazard communication program, MSDSs and the like, in location accessible 24 hours a day and convenient to employees, subcontractors and their employees and representatives for Owner, Architect and other agencies that may visit the Project Site and come in contact with hazardous chemical substances in accordance with local regulations.
   c. Fire Extinguishers: Provide and maintain one each, 5 gallon fire extinguishers, pressurized water for Class A fires; and general purpose dry chemical for Class A B C fires, in Contractor's office.
   d. Office furniture, plan racks, and the like as required.
3. Computers: Provide computers for email access and construction use.
4. Telephone/E-mail as per Section 01 51 00, Temporary Utilities. Provide telephone instrument in meeting space.
   a. See Section 01 51 00 for list of emergency telephone numbers at telephone.
5. Miscellaneous: Maintain minimum 6 sets of hard hats, safety glasses and earplugs for use by visitors.
6. Provide access to drinking water and toilet facilities.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces on-site in pre-approved location.
   1. To requirements of various trades.
   2. Only materials, appliances and paint to be used for this Project may be stored in such areas.
   3. Ventilation: Comply with specified code requirements for products stored.
   4. Heating: Adequate to maintain temperature specified in respective Sections for products stored.
   5. Lighting: Temporary light in all areas of the sheds.
   6. Cleanliness: Must be kept clean and in good order.
   7. No materials storage that will permanently stain building surfaces or construction activities that drips oil, or emits sparks are allowed inside project building.
   8. Storage units for hazardous materials or wastes must shall adequate containment to prevent a release to the environment in case of a spill.

D. Installation:
   1. Prepare sites as required. Provide proper surface drainage.
   2. Construct temporary field storage sheds on proper foundations. Provide connections for any required utility services.
      a. If portable or mobile buildings are used, install securely in place.
      b. Provide steps and landings at entrance doors.
      c. Mount thermometer at convenient outside location, not in direct sunlight.

E. Maintenance and Cleaning: Provide periodic maintenance and cleaning for temporary structures, furnishings, equipment, and services.

3.04 VEHICULAR ACCESS AND PARKING

A. Traffic Regulations:
   1. Conduct operations in such a manner to avoid unnecessary interference to existing pedestrian and vehicle traffic. Minimize heavy vehicle traffic to and from site during peak traffic hours (7-9 a.m. and 3-6 p.m.). Do not park vehicles in traffic lanes. Provide flag persons, and traffic control signs and devices as required by local

authorities; and as requested by Architect or Owner. Adhere to construction traffic routes as required by the City of Mercer Island. Notify and coordinate with local requirements in advance of any unusually long or large deliveries. Assemble cranes during off hours.

2. Maintain fire lanes and roadways continuously, as required by the City, County and its police and fire departments.
3. At no time allow operations to interfere with the safe and orderly operation of the neighborhood. Encroachment by the Contractor's operations will not be permitted.
4. For the duration of the Contract, immediately repair or replace appurtenances damaged or destroyed in the performance of work included herein.
5. Minimize vehicular traffic to the Project Site to the greatest extent possible. Use of carpools, vanpools, and transit is encouraged.
6. Whenever the Contractor's activity affects vehicular or pedestrian traffic, install and maintain light barriers, signals, separators and the like, for the safety of the public.
    a. Temporary traffic maintenance items furnished by the Contractor shall remain Contractor's property and shall be removed from the Project Site by the Contractor.

B. Parking: Parking is permitted on-site only in areas indicated on Drawings.

C. Miscellaneous Requirements:
1. Schedule work outside the construction limit line at the convenience of the Owner and take measures to ensure the safety of the public.
2. Before starting the Work, establish with the Owner the point of entry to the site and the route within the site that may be used by Contractor's personnel to gain access to the construction area.
3. Conduct operations in such a manner as to avoid damage to existing structures, walks, curbs, paving, grass areas, plantings and the like that are to remain.
    a. Provide the necessary protection and replace, repair or restore damaged surfaces to their original condition at no cost to Owner.

3.05 REMOVAL OF CONSTRUCTION FACILITIES

A. Completely remove temporary materials, facilities, equipment, and services when construction needs can be met by use of permanent construction, or at Project completion (including but not limited to scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, protective enclosures, silt fences, and other such facilities and equipment).

B. Remove foundations for temporary storage sheds.

C. Clean and repair damage caused by installations or by use of temporary facilities. Grade the areas of the site affected by temporary installations to required elevations and slopes, and clean the site areas affected by temporary installations. Perform any necessary filling and grading to make work conform to required construction finish elevations and slopes. Patch holes in pavement to match existing where fence posts have been removed.

D. Restore permanent facilities used for temporary purposes to specified, or to original condition.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Prevent injury to persons, including from traffic.
2. Protect the work from Construction operations.
3. Prevent public entry.
4. Protect adjacent properties, structures, and utilities.
5. Remove barriers at completion of the Work, or when no longer needed.
6. Protect existing equipment and systems.
7. Provide barriers to protect stored equipment and electronic wiring.
8. Maintain barriers until Final acceptance.

B. Related Sections:
1. Section 01 41 00 - Regulatory Requirements
2. Section 01 52 00 - Construction Facilities
3. Section 01 56 36 - Security

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: See Section 01 41 00, Regulatory Requirements, for federal, state, city, and other local codes and regulations, as applicable. Comply with the most stringent requirements.

2.02 MATERIALS

A. Materials may be new or used. They shall be suitable for intended purposes, reasonably clean, and uniform in appearance. They shall not violate requirements of governing codes and standards.

2.03 GENERAL CONSTRUCTION FENCING

A. Materials to Contractor's option, minimum fence height 6 feet. Use either of following fence systems.
1. Open Mesh Fence:
a. No. 11 gage, 2 inch mesh, galvanized chain link fabric.
b. Galvanized steel posts: 1-1/2 inch line posts and 2 inch corner posts.
2. Solid Fence:
a. Plywood: Exterior Type C-C face piles, thickness as appropriate to framing requirements.
b. Framing: 2 inch x 4 inch nominal rails and 4 inch x 4 inch nominal treated wood posts.
c. Paint: Standard grade exterior paint.

2.04 BARRIERS AND OTHER PROTECTIVE DEVICES

A. Choose any allowed appropriate material, as suitable for required purposes.

B. For interior barriers use wood framing and reinforced plastic walls, as indicated.

PART 3 - EXECUTION

3.01 GENERAL

A. Install barriers neatly, reasonably uniform, and structurally adequate for required purpose. Maintain barriers as long as required. Relocate barriers as required by construction progress.

3.02 CONSTRUCTION FENCES

A. Prior to start of Project work and at earliest reasonable date, install enclosure fence in location indicated on Drawings and to suit local and Owner requirements.

3.03 BARRIERS AND OTHER PROTECTIVE DEVICES

A. Provide and install barriers and protective devices as required and necessary.
   1. Use certified flaggers.
   2. Maintain barriers in safe and secure condition for duration of their need.

3.04 REMOVAL

A. Completely remove specified facilities including foundations, when no longer needed. Clean areas as required at installations.

B. Clean and repair damage caused by installations. Perform any necessary filling and grading to make work conform to required construction finish elevations and slopes. Patch holes in pavement to match existing where fence posts have been removed.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Protection of Work, stored products, and construction equipment from theft and vandalism;
2. Protection of premises from entry by unauthorized persons.

B. Related Sections:
1. Section 01 31 19 - Project Meetings
2. Section 01 32 33 - Photographic Documentation
3. Section 01 51 00 - Temporary Utilities
4. Section 01 52 00 - Construction Facilities
5. Section 01 56 00 - Temporary Barriers and Enclosures
6. Section 01 66 00 - Product Storage and Handling Requirements

1.02 QUALITY ASSURANCE

A. Pre-construction Meeting: Coordinate with Owner to establish and maintain security program to prevent unauthorized entry and to protect against other security problems, including loss due to theft, vandalism, and fire.

B. Arrange with Owner for access keys as necessary to perform Work of this Contract. Separate construction keying is not required.
1. Keys Issued by Owner: Do not duplicate. Return to Owner at Final Completion.
2. Keys not Returned: Re-key locks at Contractor's expense to keying schedule, as required by Owner.

C. Establish adequate flood lighting to allow monitoring of Project site during evening hours.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 ENTRANCE CONTROL

A. Entrance Control: Provide control of persons and vehicles entering and leaving Project site.
1. Maintain log with names and dates of those who enter site, including visitors.

B. Personnel: Allow entrance only to authorized persons with proper identifications. Exclude from site personnel not properly identified.

C. Maintain public access to areas outside of project limits and coordinate with Owner at least 2 weeks in advance of planned disruptions to the public access to the adjacent areas outside of the project limits.

3.02 MAINTENANCE OF SECURITY

A. Initiate security program promptly after job mobilization, when enclosure fence, gates, and temporary enclosures are installed. Lock at end of each working day.

B. Provide adequate security to protect the building, stored materials and work site from unauthorized entry. The Contractor is solely responsible for any theft, damage, or injury caused by a breach of such security.

C. Maintain security site lighting systems as approved by Owner in advance.

D. Maintain security program throughout construction period, until Owner occupancy or Owner acceptance precludes the need for Contractor security.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Familiarity with Laws and Ordinances:
a. Abide by the laws and ordinances where and if applicable to this Project.
b. Pay fines and penalties resulting from the Contractor's failure to comply with the Federal, State, and local pollution control regulations set forth herein.
c. Costs involved with these preventive measures are considered incidental to the construction of this Project and shall be included in the contract price for the various items which comprise this Contract.
2. Environmental protection.

B. Related Sections:
1. Section 01 52 00 - Construction Facilities: temporary controls
2. Section 01 74 10 - Cleaning

1.02 AIR POLLUTION

A. Maintain air quality within the National Emission Standards for Hazardous Air Pollutants. Air pollutants being defined as that to which no ambient air quality standard is applicable and which in the judgment of the Administrator of the Environmental Protection Agency Clean Air Act may cause, or contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness.

B. Comply with local standards and regulations, as applicable.

1.03 WATER POLLUTION CONTROL

A. In order to effectively control water pollution, erosion and related damage, perform work of a temporary nature.

B. Comply with local standards and regulations, as applicable.

1.04 NOISE POLLUTION AND CONTROL

A. Conduct work, use appropriate construction methods and equipment, and furnish and install acoustical barriers as necessary, so that no noise emanating from the process or any related tool or equipment will exceed noise levels as indicated.

B. Observe EPA and Local Laws and the guidelines in this Project Manual concerning allowable noise levels. When allowances differ between allowable noise levels, adhere to the most strict rule.
1. Pursuant to the EPA Noise Control Act of 1972, conduct the Work within the noise limits specified as follows:
a. Section 1(a): For the purposes of this ordinance, "allowable level of noise" means not more than ninety five (95) decibels as measured on the "A" scale of a General Radio Company #1551-B sound level meter, or equivalent, stationed at a distance of not less than 20 feet to the side of a motor vehicle as such motor vehicle passes the sound level meter, or is stationed not less than 20 feet from a stationary motor or engine, horn, whistle, amplifier, tool or other object being tested.

C. Conform to City of Mercer Island noise control regulations. Be familiar with applicable laws and ordinances.

D. The purpose of this specification is to keep the level of construction noise inside adjacent buildings from exceeding a dBA 55 curve during normal working hours. Night time activities, if any, should be quiet.
   1. Conduct work, use appropriate construction methods and equipment, and furnish and install acoustical barriers as necessary, so that no noise emanating from the process or any related tool or equipment will exceed noise levels as indicated.
   2. Keep the level of construction noise inside adjacent buildings from exceeding a dBA 55 curve (with windows closed) during normal working hours. Night time activities, if any, should be quiet.
   3. Submittals: Submit plans to mitigate the construction noise impacts and to comply with the noise limitations, including the method of construction, equipment to be used, and acoustical treatments if necessary.
   4. Execution: Noise Control: Conform to noise control regulations.
   5. General: Equipment that can be electrically driven instead of gas or diesel is preferred.
   6. Outdoor Vehicle and Internal Combustion Engine Noise: Noise level of each piece of equipment shall not be greater than 86 dBA at a distance of 50 feet as measured under noisiest operating conditions.
   7. Air compressors: Equip with silencing packages. Electric driven are required.
   8. Jack Hammers and Roto Hammers: May be used if permitted by the Owner. Use core-drilling or saw cutting equipment

1.05 ENVIRONMENTAL PROTECTION

A. Provide methods, means and facilities required to prevent contamination of soil, water and atmosphere.

B. Use environmentally friendly products, such that are made of recycled materials and use less of natural resources; and methods and procedures that are energy efficient and non-polluting.

C. Whenever possible, recycle construction waste and demolition debris. Process recycling on site where possible, or sort debris for off-site recycling.
   1. Conform to local requirements for job-site recycling.
   2. See Section 01 74 19, Construction Waste Management, for further requirements.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Furnish, install and maintain temporary on-site informational signs and any other indicated or required by governing authorities:
a. To identify Project.
b. To direct traffic.
c. Temporary hazardous materials and waste storage must be signed according to state and local fire codes as well as applicable local, state and federal regulations.
2. Allow no sign or graphic that is objectionable to Owner, or prohibited by city or county.
3. Remove signs on completion of construction.

1.02 SUBMITTALS

A. Submit sign construction details. Where text may not be detailed, show layout for required information. Indicate margins, borders, spacing, and the like.

B. Samples: Submit samples of plywood and paint colors; obtain acceptance before proceeding. Notify Architect and Owner not less than 48 hours before patterns are finished. Architect will review before fabrication.

1.03 QUALITY ASSURANCE

A. Fabricator/Sign Painter Qualifications: Shall be regularly engaged in signage work of comparable to the work of this Project for a minimum of two years.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with City of Mercer Island signage limitations and ordinances, as applicable.

2.02 PROJECT IDENTIFICATION (ID) SIGN

A. Project ID Sign Data:
1. Project sign shall be 4 feet high by 4 feet wide.
2. Provide and install one sign, location as directed by Architect., including off-site.

B. Graphic Design, Color and Layout:
1. Project ID construction sign shall include color graphics. Graphics provided by Architect.
2. Style of Lettering: As selected or directed by Architect.
3. Sign shall identify Project, Owner, Architect, Contractor and a limited number of major subcontractors, as indicated.

2.03 INFORMATIONAL SIGNS

A. Painted signs with painted lettering, signs printed on plastic, or standard products.
1. Size of signs and lettering as required by regulatory agencies, or as appropriate to the usage.

2. Colors as required by regulatory agencies, otherwise of uniform colors throughout the Project.

B. Graphic design, style of lettering, and colors as indicated or directed.

2.04 SIGN MATERIALS

A. Sign Surface and Materials:
1. Project ID Sign Base: Exterior CDX plywood, 3/4 inch thick, with plastic sealed and sanded edges.
2. Other signs, as approved.

B. Sign Posts: 4-inch by 4-inch wood posts, pressure treated and painted.

C. Paint: Exterior quality. Use colors for graphics as directed by Architect. Colors for structure, framing, sign surfaces, and graphics as indicated or directed.

D. Rough Hardware: Galvanized.

2.05 FABRICATION

A. Paint exposed surfaces of supports, framing, and surface materials. Apply one coat primer and one coat exterior paint.

B. Paint graphics in styles, sizes, and colors, as indicated or directed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Before initial application for payment request, erect signs on the site at location of high public visibility as directed and as approved by Architect. Locate in lighted location, if possible.

3.02 MAINTENANCE

A. Maintain signs and supports in neat, clean condition. Repair damages.

B. Relocate information signs as required by work progress.

3.03 REMOVAL

A. Remove temporary signs, framing, supports, and foundations at completion of project.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Requirements for products, materials, and equipment incorporated into the work
2. Products, materials, and equipment shall be new unless specified or shown otherwise.
3. Conform to applicable specifications and standards.
4. Comply with size, make, type, and quality specified, or as specifically accepted in writing by Architect.
5. Do not use materials and equipment for other than designed or specified purposes and uses.
6. For requirements peculiar to a given product, material or piece of equipment, see appropriate technical specification Section.

B. Related Sections:
1. Section 01 25 00 - Substitutions and Product Options

1.02 DEFINITIONS

A. Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents.
1. Product: "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from the Contractor's previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
2. "Named Products" are items identified by the manufacturer's product name, including such items as a make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.
3. "Materials" are products that must be shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
4. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.03 SUBMITTALS

A. See Section 01 33 10, Submittal Requirements, for general submittal requirements.

B. Proposed Product List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
1. Submit list of all proposed color and finish selections for Architect's review and approval no later than 7 days after Notice to Proceed.
2. During construction, other materials not involving finishes or design considerations may be submitted not less than 30 days prior to date required for ordering materials. Obtain approval before ordering. Materials entered into the work without approval may require removal and replacement with specified or approved materials at no additional cost to Owner.
3. Submit electronic copies of Product List to Architect and Owner.
4. See Section 01 25 00, Substitutions and Product Options, for product options and proposed product substitutions.

1.04 QUALITY ASSURANCE

A. To the fullest extent possible, provide products of the same kind from a single source.

B. When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options. Compatibility is a basic general requirement of product/material selections.

C. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior. Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

1.05 PROJECT CONDITIONS

A. Pre-Installation Meetings: See Section 01 31 19, Project Meetings, for requirements.
   1. At each meeting review progress of other work and preparations for particular work under consideration, including requirements of Contract Documents, options, related change orders, purchases, deliveries, shop drawings, product data, quality control samples, possible conflicts, compatibility problems, time schedules, weather limitations, temporary facilities, space and access limitations, structural limitations, governing regulations, safety, inspection and testing requirements, required performance results, recording requirements, and protections.
   2. Record attenders, signification discussions of each conference, and agreements and disagreements, along with final plan of action; distribute record of meeting promptly to everyone concerned including Architect and Owner.
      a. Do not proceed with the work if associated pre-installation conference cannot be concluded successfully.
      b. Instigate actions to resolve impediments to performance of the work, and reconvene conference at earliest date feasible.
   3. Discuss issues at Progress Meetings; see Section 01 31 19.

PART 2 - PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

A. Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
   1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
   2. Standard Products: Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar application.
   3. Color and Appearance Consistency of Finish Materials: Finish materials of their respective kinds, in regards to construction phasing, shall be consistent in color and appearance throughout the total Project and shall be purchased out of one dye lot, production run, batch, and the like, as applicable, for the total Project for each respective material.

B. Additional Requirements: Material and equipment incorporated in to the work:
   1. Shall conform to applicable specifications and standards.
   2. Shall comply with size, make, type and quality specified or as specifically approved in writing by Architect.
   3. Shall be *asbestos-free, added urea-formaldehyde-free and lead-free*.
   4. Manufactured and Fabricated Products:
      a. Design, fabricate, and assemble in accordance with first-class "Workmanship" as defined in these Contract Documents.

b. Manufacture like parts of duplicate units to standard sizes and gauges; parts to be interchangeable.
c. Two or more items of the same kind to be identical and by same manufacturer (whether furnished under one Section or more).
d. Products shall be suitable for service conditions.
e. Adhere to indicated equipment capacities, sizes, and dimensions unless variations are specifically approved in writing.
f. Except where field finishing is specified or otherwise required, products and fabricated items shall be pre-finished off-site.

5. Do not use materials and equipment for other than designed or specified purposes and uses.

C. Nameplates: Except as otherwise indicated for required approval labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of the work.
1. Labels: Locate required labels and stamps on concealed surface or, where required for observation after installation, on an accessible inconspicuous surface in occupied spaces.

PART 3 - EXECUTION

3.01 INSPECTIONS AND ACCEPTANCE OF SUBSTRATES

A. Installer’s Inspection of Conditions:
1. Require Installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions.
2. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
3. Application over a substrate or under a condition is prima facie evidence of acceptance of same.

B. Contractor’s Inspection: Inspect each item of material or equipment immediately prior to installation, and reject damaged and defective items.

3.02 GENERAL INSTALLATION PROVISIONS

A. Manufacturer’s Instructions: Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
1. When Contract Documents require installation of work to comply with manufacturer’s printed instructions, obtain and distribute instructions to concerned parties, including Architect, and field office, before starting that particular work.
2. Until Project is complete, maintain at jobsite one set of complete installation and maintenance instructions for materials and equipment.
3. Handle, install, connect, clean, condition and adjust products in accordance with Manufacturer’s recommendations, directions and specified requirements.
a. Should job conditions or specified requirements conflict with manufacturer’s instructions, consult with Architect for further instructions.
b. Do not proceed with work without clear instructions.
4. Perform work in accordance with manufacturer’s instructions. Do not omit any preparatory step or installation procedure unless it is:
a. Verified with and accepted by Architect in writing.
b. Specifically modified or exempted by Contract Documents.

c. Perform additional requirements that are specified which are greater than the manufacturer's requirements and do not have a deleterious effect on the product being installed.

B. Attachment, Connection Devices and Methods:
1. Provide attachment and connection devices and methods necessary for anchoring work securely and properly in place as it is installed; install true to line and level, accurately located and aligned with other Work, and within recognized industry tolerances if not otherwise indicated.
2. Allow for expansions and thermal movements.
3. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

C. Precautions:
1. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work.
2. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
3. Re-check measurements and dimensions of the work, as an integral step of starting each installation.
4. Coordinate work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.

D. Mounting Heights: Except as otherwise indicated in the Contract Documents, mount individual units of work at industry recognized standard mounting heights, for applications indicated. Refer questionable mounting height choices to Architect for final decision.

E. In-Place Protection: General:
1. During handling and installation of work at Project Site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance.
2. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of Substantial Completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period.
3. Adjust and lubricate moving components to ensure operability without damaging effects. Contractor is responsible for function, condition and unblemished appearance of all work on Project, and any item or work judged defective by Architect shall be subject to replacement at no additional cost to Owner.
4. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period.

F. Replacement: Components with damage affecting appearance, function or structural characteristics will not be accepted; repair and/or replace such items on the Project as directed at no additional expense to Owner.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. General requirements for delivery, handling and storage of products and materials.

B. Related Sections:
1. Section 01 29 10 - Applications for Payment: payment for on- and off-site storage

1.02 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. General:
1. Access routes, staging areas, loading restrictions, and other uses of the project site shall be coordinated and approved by the Architect and Owner prior to the start of work. Ease of access to the project construction site is limited and shall be verified prior to moving materials.
2. Protect all materials from moisture and contamination, and damage.

B. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
1. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing to prevent damage, deterioration, loss or theft. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage. Where appropriate, submit SDS for all delivered products.
2. Schedule delivery to minimize long-term storage at the Project Site and to prevent overcrowding of construction spaces.
3. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
    a. Store with lids sealed, outside of building, all glues, adhesives, sealers, caulking, mastics, cleaners, paints, thinners and related flammable and hazardous materials.
4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that quantities are correct and that products are undamaged and properly protected. Reject damaged and defective items.

C. Storage:
1. Store products at the site in a manner that will facilitate inspection by Architect, and measurement of quantity or counting of units. Store and protect in accordance with manufacturers' instructions, with seals and labels intact and legible.
2. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
3. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
4. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
5. Prevent contact with material that may cause corrosion, discoloration, or staining.
6. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

7. See Section 01 29 10, Applications for Payment, for additional information regarding off-site storage of materials.

1.03 PROTECTION

A. Protect products after installation (see more detailed requirements in individual Specification Sections):
   1. Protect installed work from damage (from all causes) until Owner's approval.
   2. Provide substantial coverings such as boarding, building paper, polyethylene sheeting, and the like as necessary to protect installed products. Protect against:
      a. Traffic damage;
      b. Subsequent construction operations; and the like.
   3. Remove coverings when no longer needed.

B. Repair or replace damage as required for acceptance, at no cost to the Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Surveying Field Layout services. Include:
      a. field measurement and confirmation work;
      b. measured field drawings and detailing;
      c. site engineering of shoring and support systems;
      d. field coordination and confirmation of shop drawing submittals;
      e. field review and coordination of system installations.
   2. Control elevations, lines, levels and the like.
   3. Quality control.
   4. Project Record Documents.

B. Owner will provide survey documenting existing conditions at project start. Contractor is responsible for maintaining datum and reference points during construction.

C. Related Sections:
   1. Section 00 31 00 - Available Information
   2. Section 01 78 00 - Closeout Submittals

1.02 PROJECT RECORD DOCUMENTS

A. Maintain complete, accurate log of control and survey work as it progresses.

B. Submit Record Documents under provisions of Section 01 78 00.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify locations of survey control points prior to starting work. Promptly notify Owner of any discrepancies discovered.

B. Establish and maintain a minimum of 2 benchmarks on the site, referenced to data established by the survey control points. Record benchmarks on Record Documents.

3.02 SURVEY REFERENCE POINTS

A. Locate survey control and reference points.

B. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

C. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

D. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

3.03 SURVEY REQUIREMENTS

A. Establish lines and levels, locate and lay out by Surveyor or GPS unit, by instrumentation and similar appropriate means. Establish benchmarks and markers to set lines and levels for construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

B. Locate and Lay Out:
   1. Grid or axis for structures.
   2. Building foundation, exterior corners, and floor elevations for brick restoration.
   3. Any additional data required for completion of the project.

C. Periodically verify layouts by same means.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Provide cutting, fitting, and patching, to:
1. Make its several parts fit together properly
2. Join new Work to existing work, and fit it to receive or be received by work of other contractors shown upon, or reasonably implied by the Drawings and Specifications for the completed project;
3. Uncover portions of the Work to provide for installation of any ill-timed work;
4. Remove and replace defective work;
5. Remove and replace work not conforming to requirements of Contract Documents;
6. Remove samples of installed work as specified for testing; and
7. For additional requirements for cutting and patching, see respective specifications sections.

1.02 SUBMITTALS

A. Submit written request to Owner and Architect at least 14 days in advance of executing any cutting and alteration affecting:
1. The work of the Owner or any separate contractor;
2. Structural value or integrity of any element of Project;
3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems;
4. Efficiency, operational life, maintenance, or safety of operational elements; and
5. Visual qualities of sight-exposed elements.

B. Include with Request:
1. Project identification;
2. Description of affected work and products to be used;
3. Necessity for cutting or excavating;
4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of Project;
5. Description of proposed work designating extent of cutting, patching, or excavating or alteration. Include the following:
a. Name trades to be executing the Work;
b. Products proposed to be used;
c. Extent of refinishing to be done;
d. Alternatives to cutting and patching;
e. Cost proposal (when applicable); and
f. Written permission of any separate contractor whose work will be effected.
g. List of utilities that will be disturbed or otherwise affected by Work. Indicate duration of disruption.

C. Should work conditions or schedule indicate change of products from original installation, submit substitution request as specified in Section 01 25 00, Substitutions and Product Options.

D. Submit written notice to Owner designating date and time work will be uncovered.

1.03 QUALITY ASSURANCE

A. Employ an experienced firm that has specialized in alteration work similar in material and extent to that indicated for this Project to perform cutting and patching for:
1. Sight-exposed finished surfaces;

2. Weather-exposed and moisture-resistant elements;
3. At penetrations of waterproof membranes, such as test areas.

B. Employ original installer to perform cutting and patching of newly installed materials.

C. Cost of cutting and patching work caused by defective or ill-timed work shall be borne by the party responsible, and at no cost to the Owner.

D. Do not endanger any work by cutting, excavating, or otherwise altering the Work, and do not cut or alter completed Work without prior approval of the Owner. See Article 1.02.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Comply with Specifications and standards for each applicable product.

B. Product Substitution: For any proposed change in materials, submit request for substitution under provisions of Sections 01 61 00, Basic Product Requirements, and 01 25 00, Substitutions and Product Options.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of Project. Inspect elements subject to damage or movement during cutting and patching.

B. After uncovering work, inspect conditions affecting product installations and work performance.

C. Submit written reports to Owner and Architect of unsatisfactory work or questionable conditions. Do not proceed with work until Owner issues further instructions.

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure structural integrity of affected work portion.

B. Provide devices and methods protecting other portions of project from damage.

C. Provide protection from elements for work exposed by cutting and patching.

D. Maintain excavations and keep free from water which may damage or hinder proper performance of the work.

3.03 CUTTING

A. Execute cutting and removals by methods preventing damage to other work. Use core drilling equipment and diamond saws for cutting required openings in concrete and masonry. Do not overcut corners. (Do not use hammering and chopping tools.) Diamond saw-cut only at visible cuts. Provide proper surfaces to receive repairs.

B. Execute any required excavating and backfilling by methods preventing settlement or damage to other work.

C. Uncover work to install improperly sequenced work.

D. Remove and replace defective, non-conforming or ill-timed work.

E. Remove samples of installed work for testing when requested.

F. Execute fitting and adjustment of products to provide finished installations complying with specified products, functions, tolerances, and finishes.

G. Restore work cut or removed. Install new products as required to complete work in accordance with Contract Documents.

H. Cutting shall be done wet whenever possible. Take precautions to protect workers and public from dust.

3.04 PATCHING

A. Execute patching to complement adjacent work.

B. Fit products together to integrate with other work.

C. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing.

D. Restore work with new products in accordance with requirements of Contract Documents.

E. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

F. Refinish entire surfaces as necessary to provide even finish matching adjacent finishes.
   1. For continuous surfaces, refinish to nearest intersection.
   2. For an assembly, refinish the entire unit.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Progress Cleaning: Exterior cleaning during construction.
a. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Protect work in progress and adjoining work on the basis of continuous maintenance.
b. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.
2. Final Cleaning: Conduct cleaning and disposal operations as specified, using skilled Cleaning Contractor.

B. Related Sections:
1. Section 01 74 19 - Construction Waste Management

1.02 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meetings: Convene to discuss cleaning practices and applicable standards.
1. Pre-Final Cleaning Conference: Attendees shall include the Contractor, Architect, Owner, Cleaning Contractor's Project Manager and Foreman, and others as applicable.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Conform to city, county, state, and federal ordinances, rules, regulations, and requirements in regard to site clean-up requirements.
2. Conform to state safety regulations.
3. Documentation of waste management, spill response, procedures and contingency plans shall be made available upon request to Architect.

2.02 MATERIALS

A. Materials - General:
1. Use environmentally sensitive cleaning products where possible.
2. Do not use cleaning materials damaging to surfaces.
3. Do not use cleaning materials creating hazards to health or property.
4. Use only cleaning materials and methods recommended by manufacturer of surface material to be cleaned.

PART 3 - EXECUTION

3.01 CLEANING DURING CONSTRUCTION

A. General Requirements:
1. Execute periodic cleaning. Keep work, Project Site, and adjacent properties free from accumulation of construction waste materials, rubbish, and windblown debris.
a. Protect new materials from damage by construction debris.
b. Dispose daily of flammable, hazardous, and toxic waste materials. Storage of these materials will not be permitted on the interior of the building.

1) Disposal and storage shall be in accordance with 40 CFR; 49 CFR; state and local fire codes and regulations.

c. Burning is not permitted on the Project Site.

2. Provide on-site containers for collection of waste materials, debris, and rubbish.
   a. Periodically remove from site.
   b. Dispose of legally at disposal areas away from site.
3. Store volatile wastes in covered metal containers and remove from premises daily. Prevent accumulation of wastes which create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.

B. Dust Control: Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

C. Debris Control:
1. In accordance with Section 01 74 19, Construction Waste Management, and the following:
   a. Keep all areas free of extraneous debris.
   b. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, access points, along access roads and haul routes, and public right-of-ways.
      1) Provide containers for deposit of debris as specified.
      2) Prohibit overloading of trucks to prevent spillages on access and haul routes. Provide periodic inspection of traffic areas to enforce requirements.
   c. Schedule periodic collection and disposal of debris as specified.
      1) Provide additional collection and disposal of debris whenever the periodic schedule is inadequate to prevent accumulation.
   d. Keep storm sewers free of debris or extraneous materials.

D. Street and Off-Site Clean-Up:
1. Vehicles used to haul materials off-site shall be constructed or loaded so as to prevent any leaking of materials from the vehicle. Keep sidewalks, lawns, parking areas and streets clear of construction materials, debris, and dirt attributed to the Contractor or the subcontractors. Clean adjacent streets with regular sweeping and washing as needed to control dirt and dust until agreed with Owner and Architect that it is no longer needed.
2. Plan operations to minimize the need for cleaning street areas adjacent to the construction site, access roads, and haul routes utilized for Work under this Contract. The use of water to perform cleaning work shall be held to a minimum. Provide self-propelled pickup sweepers for pavement cleaning and for debris removal. As a minimum:
   a. Clean streets in accordance with local street use requirements.
   b. Clean streets of debris from installation of systems or other construction activities.
   c. Prohibit overloading of trucks to prevent spillages on streets.
   d. Water wash staging areas as needed to control dust.
   e. Provide wheel wash facilities as needed, to remove dirt, clay stones, or other deposits from the tires or between wheels before trucks and/or other equipment will be allowed to travel over paved streets.
      1) Water used for washing vehicles and equipment shall not be allowed to enter storm drains unless sediment, petroleum products, fresh concrete products or other deleterious materials are separated prior to discharge.

E. Progress Inspections: Continually, and not less than every third day, inspect performed cleaning in conformance with cleaning standards. Close off cleaned areas or fully protect finished/cleaned work.

3.02 FINAL CLEANING

A. Cleaning includes but is not limited to following procedures:
   1. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, non-permanent labels, and other foreign materials from sight-exposed surfaces.
      a. Clean hard-surfaced finishes, to dirt-free condition, free of dust, stains, films and similar noticeable detracting substances.
      b. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces.
      c. Restore reflective surfaces to original reflective conditions.
   2. Remove debris from limited-access spaces.
   3. Provide special cleaning for all trades at completion of work as follows:
      a. Remove marks, stains, fingerprints, dust, dirt from painted and decorated work.
      b. Clean exterior metal surfaces of oil, stains, dust, dirt, paint and the like. Leave without finger marks or other blemishes.
      c. Remove crates, packing materials and the like from site.
   4. Clean Project Site (yard and grounds), and areas affected by these construction activities, including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition. Remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved to a smooth, even-textured surface.
      a. Include parking and other staging areas.
   5. Building Exterior:
      a. Prior to project completion, drag the construction site with a magnet rake to pick up hidden metal.
      b. Clean drain line of all debris and material.

B. Removal of Protection: Except as otherwise indicated or requested by Architect, remove temporary protection devices and facilities installed during course of the Work to protect previously completed work during remainder of construction period.

C. Extra Materials: Where excess materials of value remaining after completion of associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

D. Final Inspection: Prior to final completion, or Owner occupancy, inspect exposed surfaces. Verify that the entire Work is clean.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Administrative and procedural requirements for construction waste management and disposal activities.
2. Description of a job-site Construction Waste Management (CWM) Plan.
3. Job-site waste reduction requirements.

B. Related Sections:
1. Section 01 31 19 - Project Meetings
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 01 51 00 - Temporary Utilities
4. Section 01 52 00 - Construction Facilities: facilities and controls during construction
5. Section 02 41 19 - Selective Building Demolition

1.02 CONSTRUCTION WASTE MANAGEMENT GOALS

A. The Owner has established that this Project shall generate the least amount of construction waste possible and that waste disposal in landfills shall be minimized.
1. Diversion Goal: Divert through salvage, reuse and/or recycle a minimum 75 percent of all Construction & Demolition (C&D) waste generated. Calculations may be based on dry weight or volume, but must be consistent throughout.

B. Develop a CWM Plan for this Project for the Owner and Architect's review.

C. Transport wastes in accordance with federal, state and local transportation requirements, including driver training, placarding and use of shipping papers or waste manifests.

1.03 DEFINITIONS

A. Waste: For the purpose of this Section, the term applies to all excess building materials. Waste includes materials that can be salvaged, returned, recycled, or reused.

B. Trash (or Garbage): That part of the waste that cannot be returned, reused, recycled, or salvaged.

C. Construction & Demolition Waste (C&D): Non-hazardous solid wastes resulting from construction and demolition activities. C&D waste includes, but is not limited to, building materials, demolition rubble, landscaping materials, packaging materials, debris, and trash.

D. Proper Disposal: As defined by the jurisdiction receiving the waste.

E. Landfill: Public or private business involved in the practice of trash disposal.

F. Hazardous Waste: Any material or byproduct of construction that is regulated by Environmental Protection Agency and that may not be disposed in landfill or other waste end-source without adherence to applicable laws.

G. Material Recovery Facility (MRF): A general term used to describe a waste-sorting facility. Mechanical, hand-separation, or a combination of both procedures are used to recover recyclable materials from other waste, which is then disposed of as trash.

H. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the material in the manufacture of a new product. Can be conducted on site (as in the grinding of concrete and reuse on site).

I. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Recycling facilities have their own specifications for accepting materials. Depending on the type of facility, it may accept source-separated waste or co-mingled waste or both.

J. Recycling Services. Types of services include:
   1. Source-Separated: Construction waste is sorted on the job-site in separate containers as it is generated. The recycling hauler takes the materials directly to a recycler or a transfer site.
   2. Co-mingled: This service allows contractors to put select recyclables such as wood, cardboard, and metals in one container. The recycling hauler takes the materials to a sorting facility where the materials are separated for recycling.

K. Reuse: Making use of a material without altering its form.

L. Salvage: Recovery, protection and storage of materials for on-site reuse or donation to a third party. See also, Section 01 35 91, Historic Treatment Procedures.

M. Source-separated Materials: Materials that are sorted at the site for the purpose of reuse or recycling.

N. Co-mingled Materials: Mixed recyclable C&D material that has not been source-separated. Some facilities will separate co-mingled materials off-site for recycling.

1.04 REVENUES

A. Revenues or other savings obtained from recycled, reused, or salvaged materials shall accrue to Contractor unless otherwise noted in the Contract Documents.

1.05 SUBMITTALS

A. Submit in accordance with Section 01 33 10, Submittal Procedures, and the following:
   1. Draft CWM Plan: Within 7 days after receipt of Notice of Award and prior to any waste removal by the Contractor from the Project, develop and submit a draft CWM Plan to the Architect and Owner for review. Include:
      a. Responsibilities of Waste Management Coordinator.
      b. Requirements for documenting quantities of each type of waste and its disposition.
         1) Types and estimated quantities of salvageable materials that are expected to be generated during demolition. Calculations may be based on dry weight or volume, but must be consistent throughout.
         2) Method to be used for removal, handling, storing and reuse of these materials. Methods may include one or more of the following options:
            a) Contracting with a demolition specialist to salvage all or most of materials generated;
            b) Selective salvage as part of demolition contractor's work;
            c) Reuse of materials on-site or in new construction.
         3) Types and estimated quantities (where reasonably available) of recyclable materials expected to be generated during construction in significant amounts. Calculations may be based on weight or volume, but must be consistent throughout.

c. Procedures and methods for waste collection and transportation to recycling and disposal facilities. Methods shall include one or more of the following options:
   1) Requiring subcontractors to take materials back for recycling at a permitted facility;
   2) Contracting with a full service recycling service to recycle all or most materials at a permitted facility;
   3) Processing or reusing materials on-site. Provide details.

2. At a minimum, the CWM Plan shall be designed to divert the following waste categories from the landfill:
   a. Cardboard (from supplies and packaging);
   b. Concrete, brick and mortar (not to be reused or reinstalled);
   c. Metals;
   d. Paint;
   e. Plastic film (sheeting, shrink wrap, packaging);
   f. Job-shack wastes, including office paper, blueprints, pop cans and bottles, and office cardboard.

B. Final CWM Plan. Within 7 days after Owner has determined that the recycling options addressed in the draft CWM Plan are acceptable and prior to waste removal, submit the final CWM Plan.

C. Final Report: The Contractor shall submit within 14 days of completing the project a final waste management report of waste generated at the Project. The final report shall be submitted to the Owner and Architect, and shall contain the following information:
   1. For each material recycled, reused, or salvaged from the Project, the total amount (in tons or cubic yards), the receiving party, and the net total cost or savings of salvage or recycling the material. Attach back-up materials. For co-mingled materials, the Contractor shall include the co-mingled C&D recycling rate of the receiving facility.
   2. The total amount (in tons or cubic yard of material) of material disposed of as garbage from the Project, the location of the Receiving Facility, and the total disposal cost. Include back-up materials.
   3. The Contractor shall be responsible for providing such information whether directly involved in recycling the materials or not (whether the Contractor performs recycling tasks or hires or requires others to do so).

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of Authorities Having Jurisdiction.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 COMMUNICATION

A. Designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the CWM Plan for the Project.

B. Distribute copies of the CWM Plan to each entity performing work at the site.

C. Use safety meetings, signage, and subcontractor agreements to communicate the goals of the waste reduction plan, including instruction about appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties on the Project.

D. Subcontractors shall report all waste and how much was diverted that they take off site that is not controlled through the on-site collection system being monitored by your CWM Plan.

3.02 MATERIALS CONSERVATION

A. Protect products from damage during storage, installation, and in-place. Materials that become wet or damp due to improper storage shall be replaced at contractor's expense.

B. Include in supply agreements a waste reduction provision specifying a preference for reduced, returnable, and/or recyclable packaging.

C. Use detailed take-offs and use to identify location and use in structure to reduce risk of unplanned and potentially wasteful cuts.

3.03 MATERIALS HANDLING

A. Designate specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse and return. Maintain recycling and waste bin areas clean and clearly marked to avoid co-mingling of materials. Bins shall be protected during non-working hours from off-site contamination.
   1. Separate recycling waste in accordance with requirements of recycling facility/hauler.
   2. Handle, store, and transport materials in a manner that meets the requirements of the designated acceptance facility.
   3. Except as otherwise specified, do not allow waste materials to accumulate on-site.
   4. As part of regular clean-up, schedule and conduct visual inspections of dumpsters and recycling bins to identify potential contamination of materials.

B. Separately store and dispose of hazardous wastes in accordance with regulations of Authorities Having Jurisdiction.

3.04 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.

B. Remove C&D waste materials and debris from Owner's property on a regular basis, and transport in a manner that will prevent spillage on adjacent surfaces and areas.

C. Do not burn or bury waste materials in project site.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Administrative and procedural requirements for contract closeout including, but not limited to, the following:
a. Maintenance Materials submission, as applicable.
b. Substantial Completion.
c. Final Acceptance.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements

1.02 SEQUENCE OF CLOSE-OUT

A. The Contractor's superintendent shall perform a review of all installed work (general, mechanical, electrical) and note any corrections, touch-up, or otherwise restore marred, exposed surfaces that are necessary to comply with the Contract Document requirements before requesting the Architect to review the Work. The Contractor shall develop a written correction list (pre-punch list) and track the completion of the items by initialing and dating each item, signifying that it has been reviewed and properly completed.

B. Comply with items under Article 1.06, Substantial Completion, by submitting documentation and the Contractor's initialed correction list to the Architect with a letter requesting the Architect's review of the project.

C. Upon receipt of the information from the Contractor, the Architect will visit the site and review the Project with the Owner for compliance with the Contract Documents. If during this review by the Architect and Owner the Project is not deemed substantially complete the Architect will notify the Contractor to complete the Project for compliance with the Contract Documents. After completion of the pre-punch list, the Contractor shall resubmit a letter to the Architect requesting a review of the Project. The Architect will develop a punch-list of any work that still needs corrections. If the list is incidental corrective punch work to complete, the Architect will issue the notice of Substantial Completion with the corrections list attached. If the correction work is still significant, the Contractor shall complete the corrections in the same format as its pre-punch list and request additional reviews by the Architect as necessary to establish that the Project is complete to the point where the Substantial Completion notification can be issued.

D. Provide operation and maintenance instruction on installed equipment to Owner designated staff.

E. Correct any outstanding punch list items and submit other close-out documentation to the Architect as indicated under Article 1.07, Final Acceptance. When punch lists have been verified by the Architect as being complete and documentation is satisfactory and accepted by the Architect, the Owner will issue its notification of Final Acceptance.

1.03 PROJECT RECORD DOCUMENT SUBMITTAL

A. Refer to Section 01 78 00, Closeout Submittals.

1.04 OPERATION AND MAINTENANCE MANUALS

A. Refer to Section 01 78 00, Closeout Submittals.

1.05 MAINTENANCE MATERIALS

A. Provide maintenance materials (tools, spare parts, extra stock, and the like) indicated in other sections of the specifications.
   1. Submit a receipt to the Owner identifying the product and quantity that is being provided.
   2. Obtain Owner's signature on the receipt.
   3. Send original receipt to Owner and include a copy of the receipt in the Warranties, Bonds, Extra Stock, and Permits manual.

1.06 SUBSTANTIAL COMPLETION

A. Substantial Completion: Before requesting Architect's review for certification of Substantial Completion, complete the following, and provide a letter of request for Substantial Completion. List exceptions in the request.
   1. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Advise the Owner of pending insurance changeover requirements.
   3. Make final changeover of permanent locks and transmit keys, and a list identifying each key to the Owner. The list is a receipt to be signed by the Owner with a copy delivered to Owner a copy placed in the Operation and Maintenance Manual hardware section. Advise the Owner's personnel of changeover in security provisions.
   4. Discontinue and remove temporary facilities from the site, along with mock-ups, construction tools, and similar elements.
   5. Complete final clean-up requirements.
   6. Return security badges and keys.
   7. Inspection Procedures: Following initial inspection, Architect will either prepare certificate of Substantial Completion (AIA Document G704, or other agreed upon form), or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspection will form initial "punch list" for final acceptance.
   8. The date of Substantial Completion shall be used to determine the start date for warranties, and the cut-off date for liquidated damages.

1.07 FINAL COMPLETION PROCEDURE

A. Before requesting certification of Final Acceptance and final payment, complete the following. Submit all of the following items together – no partial submittals will be accepted.
   1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
   2. Submit an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner of property might in any way be responsible, have been paid or otherwise satisfied (AIA Document G706, or other agreed upon form).
   3. Submit Written Notice of Dispute Status.
   4. Submit Contractor's Affidavit of Release of Liens (AIA Document G706A, or other agreed upon form): If any liens are filed and cause the Owner to employ the services of any attorneys, the cost of the services will be deducted from the retainage.

5. Submit a letter from the Contractor's Bonding Company addressed to Owner and submitted to Architect approving release of final payment and waiving submittal of final receipts as well as a statement confirming the extension of the Bond for the one-year warranty period. Final receipts from all subcontractors and material and equipment suppliers shall be furnished to the Architect by the Contractor if the Surety does not waive this requirement.
6. Submit consent of surety to final payment (AIA Form G707, or other agreed upon form).
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
8. Certification that the Work is 100% complete in strict accordance with the Plans, Specifications, Addenda, Change Orders, and the Substantial Completion Punch List.
9. Final Inspection:
    a. Submit copy of Architect's final review list ("punch list") of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, identifying the name and company of individual who confirmed completion of each item, and date when confirmation inspection was performed.
    b. The Architect, Owner and Contractor will conduct the final inspection. See Article 1.08 below.
10. Submit State Department of Labor and Industries Affidavit of Wages Paid approved by Department of Labor and Industries for trades that have performed work on Project.
11. Submit final Record Documents.
12. Submit final Operation and Maintenance Manuals.
13. Submit final Warranties, Bonds, and Permit Manual.
14. Submit maintenance materials.
15. Submit a list of all paints used, manufacturer, and formulation for each.
16. Current names, addresses and telephone numbers for subcontractors and suppliers.
17. Evidence of Compliance with Requirements of governing Authorities.
    a. Note: Building is not intended to be occupied after completion of Phase LBB1.
    b. Others as required by Regulatory Agencies.
18. Final liquidated damages settlement statement.
19. Final Change orders signed off.
20. Final Adjustment of Accounts: Submit a final statement of accounting to Architect reflecting adjustments to Contract Sum.
21. Submit all other required close-out documents.

1.08 REVIEWS

A. The Contractor, Owner, Architect and its consultants will complete one initial and one final project review of the Work at Substantial Completion and at Final Acceptance to establish and verify completion of punch list work.
    1. Final Project Review: If the Work is acceptable and the contract fully performed, Architect will so notify the Owner and the Contractor in writing.

B. Review Fees: Should it be necessary for Architect or its consultants to perform additional reviews due to failure of Work to comply with completion status claimed by the Contractor, Architect and its consultants shall be compensated by Contractor for each additional review required until the Work is satisfactorily completed. This compensation shall be at Architect's and Architect's consultants standard hourly billing rate at time of the review, and expenses associated with the visit. Compensation by the Contractor will be through a deductive change order to the Contractor's contract.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Project Record Document submittal.
2. Operation and Maintenance manuals.
3. Warranties, Bonds, and Permits manuals.
4. Submit one electronic (PDF and or CAD, as applicable) copy of each submittal type, in addition to hard copies indicated.

B. Related Sections:
1. Division 00 - Procurement and Contracting Requirements

1.02 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with request for final Application for Payment. The following submittal procedure shall occur prior to Final Acceptance.
1. Submit electronic copy of Record Documents (drawings and specifications) to Architect for review.
2. Compile and organize any drawings or schedules in the Project Manual onto sheets of the same size as the Contract Drawings and submit with other record documents.
3. Contractor will be notified within 15 business days if submitted documents are acceptable.
4. Should the submittal be unacceptable for any reason, make requested modifications and resubmit. Continue to resubmit as necessary until the submittal is acceptable.
5. Architect will return the specifications and the Contractor's original "as-builts."
6. Submit to the Owner the reproducibles, two sets of prints, record specifications, and Contractor's original marked-up "as-builts", and one electronic copy of the final, approved information (PDF and or CAD, as applicable).

B. Operation and Maintenance Data:
1. Submit two copies of preliminary Operating and Maintenance Manuals (O&M) for review by Architect. Submit for each system 30 days prior to Substantial Completion of system completion, together with respective training synopsis; see Section 01 77 00, Closeout Procedures. Upon review, Architect will return one copy with comments.
2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect's comments. Revise content of all document sets as required prior to final submission.
3. Within 10 days following receipt of the Architect approval and comments, prepare and transmit to the Architect three final copies of each of the above manuals, and one electronic (PDF) copy of the final, approved information.
4. Content: Provide tabbed dividers for each separate product and system.arranged by section numbers on Table of Contents of this Project Manual. Prepare a Table of Contents for each product or system description identified, in three parts as follows:
   a. Part 1: Directory, listing names, addresses, and phone numbers of Architect and Consultants, Contractor, Subcontractors, and major equipment suppliers.
   b. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers.
   c. Part 3: Project documents and certificates, including the following:
      1) Shop drawings and manufacturer's printed product data.
      2) Air and water balance reports.
      3) Certificates, warranties and bonds..

C. Warranties, Bonds, Permits and Miscellaneous Documents:
   1. Match submittal requirements of Operation and Maintenance Manual.
   2. Assemble executed certificates, warranties, bonds, permits, receipts for extra stock, and Trade Directory for the project Include tabs in the general O&M Manual.
   3. Verify that documents are in proper form, contain full information, and are notarized.
   4. Include originals of each in O&M Manuals, indexed separately on Table of Contents.
   5. Provide Table of Contents neatly typed, in complete and orderly sequence. Include:
      a. Product or work item;
      b. Firm, with name of principal, address, and telephone number;
      c. Scope;
      d. Date of beginning of warranty or service and maintenance contract;
      e. Duration of warranty or service maintenance contract;
      f. Proper procedure in case of failure;
      g. Instances which might affect validity of warranty or bond; and
      h. Contractor, name or responsible principal, address, and telephone number.
   6. Original permits signed by any AHJ.
   7. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   8. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   9. For items of Work for which acceptance is delayed beyond date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
   10. Furnish two executed copies for inclusion in O&M Manuals, and one electronic copy.

PART 2 - PRODUCTS

2.01 PROJECT RECORD DOCUMENTS

A. Project Record Documents include the following:
   1. Marked-up copies of Contract Drawings.
   2. Marked-up copies of Project Manuals (Specifications and Detail Book, as applicable), all volumes.
   3. Addenda.
   4. Reviewed and marked-up copies of shop drawings and product data.
   5. Newly prepared drawings.
   6. Change Orders, RFIs and other modifications to the Contract issued in printed form during construction.
   7. Architect’s design clarifications and Proposal Requests with all supporting documentation.
   8. Record Samples.
   9. Field records for variable and concealed conditions.
   10. Record information on Work that is recorded only schematically.
   11. Manufacturer's instruction for assembly, installation, and adjusting.
   12. Other miscellaneous record documents as listed below and applicable.
      a. Certifications received in lieu of labels on bulk products.
      b. Ambient and substrate conditions tests.
      c. Testing and qualification of tradesmen.
      d. Documented qualification of installation firms and/or personnel.
      e. Load and performance testing.
      f. Field Test Reports.
      g. Inspections and certifications by governing authorities including permits and Certificate of Occupancy.
      h. Final review and correction procedures.
      i. Certificate of Substantial Completion.

PART 3 - EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintenance of Documents and Samples:
   1. Store and maintain in field office apart from the Contract Documents used for construction, one complete set of record documents and samples which are used to record as-built conditions.
   2. Do not use Project Record Documents for construction purposes; protect from deterioration and loss in a secure fire-resistant location. Maintain record documents in good order and in a clean, dry, legible condition.
   3. Make record documents and samples available at all times for review by Architect and Owner.
   4. Record actual revisions to the Work concurrent with construction progress.
   5. Ensure entries are complete and accurate, enabling future reference by Owner.
      a. Meet monthly with major subcontractors whose work is in progress, to review “as-built” revisions on the day-by-day working set of "Project Record Copy" and verify installed record information from the previous month is properly recorded on the day-by-day "Project Record Copy", with revisions and pertinent information clearly indicated.

B. Record Drawings and Shop Drawings: Keep a clean, undamaged hard copy set of Contract Drawings including coordination drawings and Shop Drawings at the Project Site as "as-built" record documents. Record “as-built” drawings shall comprise Architectural and Structural drawings, which form a part of the Contract Documents.
   1. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawings show conditions fully and accurately. Where shop drawings, RFI’s or other communication record are used to identify a change, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Items required to be marked include, but are not limited to, the following:
      a. Indicate field changes of dimension and detail.
      b. RFIs.
      c. Show measured locations of discovered or construction-concealed utilities and appurtenances referenced to visible and accessible features of the structure.
      d. Indicate details not on original Contract drawings.
      e. “X-out” conditions not constructed and appropriately annotate "not constructed" to convey the actual "as constructed" condition.
   2. Mark record sets in a clear, legible manner, using red; use other colors to distinguish between variations in separate categories of the work.
   3. Mark new information that is important to Owner, but which was not shown on Contract Documents or Shop Drawings.
   4. Show addenda items, change orders, RFI, or other means of communication used in the construction process.
   5. Show and date revisions to drawings with a "cloud" drawn around the revision.
   6. Organize Record Drawing sheets in manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Where Shop Drawings, RFI’s or other communication record are used as a reference, include a copy of them as part of the Record Drawings.

C. Shop Drawings:
   1. Maintain as record documents; legibly annotate to record changes made after review.
   2. Include subcontractor shop drawings.
   3. Record Drawing Shop Drawings shall be easily reproducible; i.e., on mylar or of standard copy machine size, as appropriate and approved.

4. Electronic copies are required for distribution.

D. Project Manual(s): During the construction period, maintain one complete copy of the Project Manual(s), including Specifications, Detail Book(s), addenda, and one copy of other written construction documents, such as Change Orders and RFI's issued in printed form during construction.
   1. Legibly mark these documents in red, to show substantial variations in actual work performed in comparison with the text of the specification and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and product data. Record at each product section description of actual products installed, including the following:
      a. Manufacturer's name and product model and number.
      b. Product substitutions or alternates utilized.
      c. Changes made by Addenda and modifications.
   2. Mark schedules, details, and the like, to indicate the actual installation where the installation varies from that indicated in the Detail Book and modifications issued..
   3. Each subcontractor shall be responsible for marking up sections that contain their own Work.
      a. Contractor shall collect marked-up record sections from each of the subcontractors and collate these sections in proper numeric order with its own sections to form a complete set of record Specifications.
      b. Contractor shall submit the complete set of record Specifications as specified.

E. Record Product Data:
   1. Maintain one copy of each product data submittal, and mark-up variations in actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation.
   2. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation.
   3. Note related Change Orders and mark-up of Record Drawings and project manuals, where applicable.
   4. Upon completion of mark-up, submit complete set to Architect for Owner's records.
   5. Where record Product Data is required as part of Maintenance Manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.
   6. Each subcontractor shall be responsible for marking up and submitting record Product Data for their own Work.
   7. Insofar as possible, insert record product data in individual sub-sections of O&M Manuals. See below.

F. Record Sample Submittal: Immediately prior to date(s) of substantial completion, Architect (and including Owner's personnel where desired) will meet with Contractor at site, and will determine which (if any) of submitted samples maintained by Contractor during progress of the work are to be transmitted to Owner for record purposes. Comply with Architect's instructions for packaging, identification marking, and delivery to Owner's sample storage place.

G. Miscellaneous Record Submittals: Include miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to date of Substantial Completion, complete miscellaneous records and place in good order, properly identified and electronically copies ready for continued use and reference. Submit to Architect for Owner's records.

H. Submit quantities as indicated in Article 1.02 above, for each submittal category.

3.02 OPERATION AND MAINTENANCE DATA

A. Operational Equipment: Prepare separate sets of O&M Manuals for Division 22, Plumbing; Division 26, Electrical; and Division 28, Electronic Safety and Security.
   1. For Each Product or System: List names, addresses and phone numbers of Subcontractors and suppliers, including local source of supplies/replacement parts.
   2. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.Include:
      a. Description of unit or system, and component parts.
      b. Equipment functions, normal operating characteristics, and limiting conditions.
      c. Assembly, installation, alignment, adjustment and checking instructions.
      d. Operating instructions and sequences for start-up, break-in, routine and normal operation, regulation and control, shutdown, and emergency conditions. Include control diagrams and sequence of operation by controls manufacturer.
      e. Routine procedures and guide for preventative maintenance and trouble shooting, including a schedule of recommended checks; disassembly, repair, and reassembly instructions.
      f. Detailed servicing and lubrication schedule. Include list of lubricants required.
      g. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
   3. Drawings and supplemental product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

B. Non-operational Products, Applied Materials and Finish Items: Submit maintenance information as specified herein. Provide detailed information relative to the following:
   1. Manufacturer’s data, giving full information on products.
      a. Catalog number, size, and composition.
      b. Color and texture designations.
      c. Information required for re-ordering special manufactured products.
   2. Instructions for care and maintenance.
      a. Manufacturer’s recommendation for types of cleaning agents and methods.
      b. Cautions against cleaning agents and methods, which are detrimental to the product.
      c. Recommended schedule for cleaning and maintenance.
      d. Instructions and recommendations for repair of finish.
   3. Moisture protection and weather-exposed products.
      a. Include product data listing applicable reference standards, chemical composition, and details of installation.
      b. Provide recommendations for inspections, maintenance, and repair.

C. For additional requirements for maintenance data, see respective Specification Sections.

D. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.03 WARRANTIES AND BONDS

A. Provide bound Manual for Warranties, Bonds miscellaneous project documents: Include:
   1. Table of Contents and include contact information as requested or required.

B. Project Warranty – General: If, within one year after the Date of Substantial Completion of the Work, or designated portion thereof, or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the work shall be corrected promptly after receipt of a written notice from the Owner to do so. This obligation shall survive Termination of the Contract.

1. The Owner will give such notice promptly after discovery of the condition.

C. Categories of Specific Warranties: Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in sections of Divisions 3 through 33 of these specifications.
   1. Special Project Warranty or Contractor Warranty: A warranty specifically written and signed by Contractor for a defined portion of the work; and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor.
   2. Specified Product Warranty: A warranty which is required by contract documents, to be provided for a manufactured product incorporated into the work; regardless of whether manufacturer has published warranty without regard for specific incorporation of product into the work, or has written and executed warranty as a direct result of contract document requirements.
   3. Coincidental Product Warranty: A warranty which is not specifically required by contract documents (other than as specified in this section); but which is available on a product incorporated into the work, by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.

D. Disclaimer 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.

E. General Limitations:
   1. It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources.
   2. Except as otherwise indicated, specific warranties do not cover failures in the work which result from:
      a. Unusual and abnormal phenomena of the elements;
      b. The Owner's misuse, maltreatment or improper maintenance of the work;
      c. Vandalism after time of substantial completion; or
      d. Insurrection or acts of aggression including war.

F. Related Damages and Losses:
   1. General: In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.
   2. Consequential Damages: Except as otherwise indicated or required by governing regulations, special project warranties and product warranties are not extended to cover damage to building contents (other than work of Contract) which occurs as a result of failure of warranted work.

G. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

H. Reinstatement of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement for the time period starting on the date of acceptance of replaced or restored work and ending on date original warranty would have expired if there had been no failure, with adjustment for depreciation.

I. Replacement Cost, Obligations: 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. Contractor shall be responsible for the cost of replacing or restoring defective Work regardless of whether the Owner has benefited from use of the Work through a portion of anticipated useful service life.

J. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, right, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

K. Rejection of Warranties: Owner reserves the right, at time of final acceptance or thereafter, to reject unsolicited and coincidental product warranties which in opinion of Owner tend to detract from or confuse interpretation of requirements of Contract Documents.

L. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or sub-subcontract for materials or units of work for project where a special project warranty, specified product warranty, certification or similar commitment is required, until it has been determined that entities required to countersign such commitments are willing to do so.

M. Co-execute warranties when required. Provide originals of each for inclusion in each operation and maintenance manual.

N. Retain warranties and bonds until time specified for submittal.

O. Manufacturer's Warranty Forms: Use manufacturer's standard forms unless otherwise indicated. Completed form shall or detract from or confuse interpretations of the Contract Documents.
   1. Manufacturer's Authorized Representative shall sign manufacturer's warranties.
   2. Subcontractor and installer shall countersign warranty where specified, including for waterproofing and roofing systems.

P. Specific Warranty Forms:
   1. Where a special project warranty (guarantee) or specified product warranty is required, prepare a written document to contain terms and appropriate identification, ready for execution by required parties.
   2. Submit draft to Owner and Architect for approval prior to final executions.
   3. Form of Warranty shall state the following:

      I (We), (insert Contractor name), certify (insert name of trade or portion of work being guaranteed) installed by (insert name of appropriate subcontractor) on the Luther Burbank Park Boiler Building on Mercer Island, Washington is performed in strict accordance with Contract Documents. Further, I (we) guarantee this work to be (watertight, without lead, other, etc.) caused by defects in materials and workmanship, for (fill in specific required guarantee period) years from (date of substantial completion), and will repair, or replace, without delay, any defects in materials and workmanship discovered within warranty period.

      Sincerely,
      (Name of Contractor/responsible principal/address/telephone number)
      Signed by Owner, Partner, or other person authorized to commit firm.

Q. Submit electronic files and hard copies as indicated in Article 1.02 Submittals.

END OF SECTION

DIVISION 02
EXISTING CONDITIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Removal and disposal of work indicated on Drawings.
2. Salvage and reinstallation of items and work as indicated on Drawings.
3. Maintain services/systems indicated to remain and protect against damage during selective deconstruction operations.
4. Protect existing construction and facilities to remain.
5. Design, install, maintain and remove temporary shoring, bracing, and structural supports as required.

B. The tall single-story Boiler Building and stack were constructed in 1928. In addition to other requirements, Work of this Section shall be performed under the guidelines of the Secretary of the Interior's Standards for the Treatment of Historic Properties.
1. It is the intent of this Contract that:
a. Repair and replacement materials shall match remaining historic construction in all physical and visual aspects including material, form, color, texture and workmanship.
b. As much of the historic material as possible shall be saved.
c. Perform work using the gentlest methods available. Prevent damage to materials and finishes to remain.
d. Sound historical materials will not be put at risk due to the work of this Section.

C. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 43 - Hazardous Materials Discovery
3. Section 01 35 91 - Historic Treatment Procedures
4. Section 01 74 19 - Construction Waste Management
5. Section 04 01 20.91 Masonry Restoration
6. Section 05 01 99 - Restoration and Maintenance of Metals: window headers

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

CFR 29 CFR 1910	Occupational Safety and Health Standards
CFR 29 CFR 1926	Occupational Safety and Health Regulations for Construction
WAC 296-24	General Safety and Health Standards

B. Definitions: Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents.
1. Demolish: Tear down and remove completely, including any anchors, unless noted otherwise, without damaging adjacent surfaces that are to remain.
2. Selective Demolition: Removal of portions of an existing construction to remain.
3. Existing items that are not to be removed, dismantled, or salvaged.
a. When indicated to be salvaged, items may be removed and salvaged to a suitable, protected storage location during selective demolition.
4. Remove: Detach from existing construction and legally dispose of, off-site, unless indicated to be removed and salvaged, or removed and reinstalled. See Section 01 35 91, Historic Treatment Procedures, for removal relating to historic work.
5. Salvage: Carefully remove or dismantle items, protect and prevent damage to items, and store for future reinstallation on this project, or deliver to Owner ready for reuse.

6. Remove and Salvage: Carefully detach from existing construction in a manner to prevent damage, and deliver to Owner ready for reuse.
7. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meetings: Convene to review schedule, sequencing, and procedures, control of dust, water and debris, protection of area, and plan for disposal.

B. Sequencing/ Scheduling: Do not begin demolition until receive authorization from Owner.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
   1. Demolition Plan:
      a. Submit proposed Plan delineating shoring, demolition and removal procedures.
      b. Plan shall include procedures and coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.
      c. Include the planned method of recycling and disposal for various types of site debris, as required by Section 01 74 19, Construction Waste Management.
   2. Permits and notices authorizing building demolition.
   3. Permits for transport and disposal of debris as required.
   4. Engineering Calculations: Temporary shoring, bracing and underpinning design and calculations must be acceptable to local Authorities Having Jurisdiction (AHJ).

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Record Documentation: Accurate record of encountered existing conditions.

1.05 PROJECT SITE CONDITIONS

A. Hazardous Materials: See Section 00 31 00, Available Information, and Section 01 35 43, Hazardous Materials Discovery.

B. Dust, Runoff and Debris Control:
   1. Prevent the spread of dust and debris to surrounding area, and avoid the creation of a nuisance or hazard in the surrounding area.
   2. Sprinkle demolition work with water to minimize dust. Do not use water if result is hazardous or objectionable conditions such as ice, flooding, or pollution.
   3. Vacuum and dust the work area daily.
   4. Sweep pavements as often as necessary to control the spread of debris.
   5. Maintain street drains and sewers open and free of debris and damage.

C. Comply with local noise regulations and restrictions.

D. Maintain required accessible routes and site access. Do not close or obstruct public access without permission from Owner and AHJ.

1.06 PROTECTION

A. Traffic Control Signs:
   1. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights.

2. Anchor barricades in a manner to prevent displacement.
3. Notify the Owner prior to beginning such work.

B. Protection of Existing Work - General:
1. Provide protection as required, and take care not to damage existing work that is to remain in place, be reused, or remain the property of the Owner.
2. Repair items, which are to remain and which are damaged during performance of the work to their original condition, or replace with new.
3. Repairs, reinforcement, or structural replacement must have Owner approval.
4. Protect existing utility services from damage.

C. Temporary Shoring and Bracing:
1. Provide new temporary shoring, bracing, supports and reinforcement for existing construction weakened by demolition or removal work.
   a. Engage a professional engineer licensed in the State of Washington experienced in the design of shoring, bracing, supports and reinforcements.
2. Properly and adequately support existing and new work during construction as required or necessary until permanent support and stiffening are installed.
3. Do not remove any existing load-carrying members until all temporary shoring and supporting structures are properly in place.
4. Do not overload structural elements or pavements to remain.

1.07 RELOCATIONS

A. Perform the removal and reinstallation of salvaged and reinstalled items as indicated with workmen skilled in the trades involved. Repair items to be reinstalled, which are damaged or replace damaged items with new undamaged items as accepted by the Owner.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC and AHJ.
1. Obtain required permits from governing authorities before proceeding. Obtain permits before closing or obstructing roadways, sidewalks, hydrants, and fire lanes.
2. Comply with applicable code, health departments, and local, state and federal agencies for demolition of structures, dust control, sediment/runoff control, local hauling and disposal of debris, noise restrictions, and fire and life safety.
3. Recycle and or legally dispose of demolition materials (salvage as indicated). Comply with federal, state, and local hauling and disposal regulations.

2.02 SALVAGE, REUSE AND OR REINSTALLATION

A. Whenever possible, salvage or recycle building materials.

B. Salvage only items noted in Contract Documents. Other existing construction in demolition areas shall be removed and recycled or legally disposed of at Contractor’s expense.
1. Store salvaged items in a dry, secure place on site, or deliver to Owner as directed.
2. Do not incorporate salvaged or used material in new construction except with prior permission of Architect or as specifically noted.

C. Salvaged items to be re-used shall be cleaned, refinished and restored, as indicated, before reinstallation. Reinstall items in locations indicated. Comply with installation requirements for new materials.
1. Provide connections, supports, and miscellaneous materials necessary to make items functional for intended use.

2. Identify items upon removal, and tag with locations correlated to the building floor plans and elevations.

D. Items to be Salvaged and Reinstalled:
1. Stone parapet caps at Boiler Building.
2. Other items as indicated on Drawings.

2.03 ALTERATIONS, CUTTING AND PROTECTION

A. Same as specified in Section 01 35 16, Alteration Project Procedures, Section 01 35 91, Historic Treatment Procedures, and Section 01 73 29, Cutting and Patching.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Check for dry rot during selective demolition. Remove dry rot.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Prior to commencement of selective demolition Work:
1. Pre-Demolition Meeting: Meet with the Architect and Owner to review Demolition Plan. Indicate any existing trees or plantings that may be affected by construction.
2. Obtain required permits and permission from local governing authorities and Owner prior to commencing Work.
3. Call for field locate and mark known underground utilities in the vicinity of the work prior to beginning work.

B. Protect work to remain, adjacent structures, facilities, utilities and site from damage.

C. Temporary Shoring and Bracing: Shoring, underpinning and excavations near existing footings and foundation walls:
1. Verify that temporary bracing, shoring, and other controls and devices are in place prior to proceeding with selective demolition.

D. Provide temporary barriers and enclosures in accordance with Section 01 56 00, Temporary Barriers and Enclosures.

3.03 SELECTIVE DEMOLITION

A. Selective Demolition:
1. Remove indicated work completely.
2. Repair any damage to adjacent structures, utilities, site, and work of this Contract to remain, to their original condition, or replace with new at no additional cost to Owner.
3. Sprinkle debris as necessary to limit dust to lowest practicable level. Do not use water to extent causing flooding, contaminated runoff or icing.

B. Hazardous Materials:
1. If materials suspected of being hazardous materials are encountered, do not disturb; immediately notify Owner.

2. See Section 01 35 43, Hazardous Materials Discovery, for administrative process for discovery of unanticipated hazardous materials.

C. Remove rubbish and debris from the project site daily; do not allow accumulations inside or outside building. Store materials that cannot be removed daily in areas specified by Owner.

3.04 DISPOSAL OF MATERIALS

A. Title to Materials: Except where specified in other Sections, materials and equipment removed, and not reused, shall become the property of the Contractor and shall be legally removed from property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Owner of the Contractor's demolition and removal procedures, and authorization by the Owner to begin demolition.
   1. The Owner will not be responsible for the condition or loss of, or damage to, such property after contract award.
   2. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

B. Sort materials for recycling to greatest extent possible. See Section 01 74 19, Construction Waste Management, for requirements.

C. Do not store or burn materials on site.

D. Transport demolished and removed debris off-site and legally dispose of. Maintain hauling routes clean and free of any debris resulting from work of this Section.

3.05 CLEANING

A. Debris and Rubbish: Remove and transport debris and rubbish in a manner that will prevent spillage on pavements, streets or adjacent areas. Clean up spillage from pavements, streets and adjacent areas.

END OF SECTION

DIVISION 03
CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Provide, install and remove formwork and accessories for cast-in-place concrete.
   a. Concealed concrete, i.e. foundations, slabs on grade, walls covered by other finish materials.
   b. Exposed concrete.
2. Include cast-in-place concrete site elements, shoring, bracing, and form supports.
3. Coordinate work with concrete finishes.
4. Formwork shall be designed by a qualified professional engineer licensed in the State of Washington.

B. Related Sections:
1. Section 01 45 23 - Testing and Inspecting Services
2. Section 03 20 00 - Concrete Reinforcing
3. Section 03 30 00 - Cast-in-Place Concrete

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ACI 117	Standard Specification for Tolerances for Concrete
ACI 301	Specification for Structural Concrete
ACI 318	Building Code Requirements for Structural Concrete
ACI 318R	Commentary
ACI 347R	Guide to Formwork for Concrete
APA PS 1	Voluntary Product Standard for Construction and Industrial Plywood with Typical APA Trademarks
ASTM	Standards indicated herein
IBC	International Building Code, with City of Mercer Island amendments

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 10, Submittal Procedures and Section 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Product descriptions, specifications, and manufacturer instructions for proprietary materials:
   a. Form materials;
   b. Accessories;
   c. Embedded items;
   d. Form coatings.
2. Design Data: Provide proposed design data, shoring, reshoring, form removal sequence, and the like.
   a. Design of formwork for structural stability and sufficiency.
   b. Indicate proposed schedule and sequence of stripping formwork, shoring removal and installing and removing reshoring.
   c. Provide data on method for determining strength of concrete prior to removal of formwork.
      1) Provide data on plans for formwork removal operations when removal of forms at concrete strength lower than that specified is proposed.

3. Structural Calculations: Design, calculations and shop drawings for formwork, reshoring or backshoring shall be stamped and sealed by a professional engineer, licensed in the State of Washington.
4. Shop Drawings:
   a. Show openings, form joints, control joints, expansion joints, reveal joints, form tie locations, bracing, temporary supports, concrete embedments and shoring.
   b. Show sizes, types, and locations of waterstops, piping, conduit, connectors, and other accessories. Include camber diagrams.
   c. Provide calculations for formwork, shoring, reshoring, and backshoring.

1.04 QUALITY ASSURANCE

A. Allowable Tolerances: Variations from plumb and designated building lines shall not exceed the tolerances specified in ACI 117.

B. Embedded Items: Where items, such as embedded plates, reglets, anchors, fastenings, conduit, piping and other items are supplied by other trades and specified elsewhere in the Contract Documents, coordinate and obtain approval of their placement in the forms prior to placing any concrete.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. On delivery to jobsite, place materials in area protected from weather.
   2. Store materials above ground on framework or blocking. Cover with protective waterproof covering; provide air circulation and ventilation; handle to prevent damage.
   3. Replace damaged or warped forms at no cost to Owner.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC.
   2. Special Inspection and Testing: Concrete work is subject to special inspection and testing. Comply with provisions of IBC, and ACI standards. See also, Section 01 45 23, Testing and Inspection Services, and Structural General Notes.
      a. Notify the Testing Agency at least 48 hours before inspection is required.

B. Performance Requirements:
   1. Design formwork, shores, reshores, and backshores to carry all loads transmitted to them and to comply with the requirements of the applicable building code. Design formwork to withstand the pressure resulting from placement and vibration of concrete and to maintain specified tolerances.
   2. Do not use earth cuts as forms for vertical or sloping surfaces unless required or permitted by Contract Documents.
   3. Limit deflection of form-facing panels to not exceed ACI 303.1 requirements.
      a. Maximum deflection of facing materials reflected on concrete surfaces exposed to public view shall be L/240 of the span between structural members of the formwork.
   4. Formed Construction: Locate and form construction joints that least impair the strength of the structure. Unless otherwise specified or permitted, locate and detail formed construction joints to the following requirements:
      a. Locate construction joints within the middle third of the spans of slabs, beams, and girders. When a beam intersects a girder at this point, offset the joint in the girder a distance equal to or greater than twice the width of the beam.

b. Locate joints in walls and columns at the underside of floors, slabs, beams, or girders and at the tops of footings or floor slabs.
c. Make joints perpendicular to the main reinforcement.

5. Provide keyways as indicated in the Contract Documents.
6. Locate ties in accordance with manufacturer's recommendations, and to prevent deflection and spalling concrete surfaces during removal.
7. Locate waterstops in joints where indicated in Contract Documents. Use pieces of pre-molded waterstop with amaximum practical length to limit number of end joints. Make joints in waterstops in accordance with manufacturer's recommendations.

2.02 FORM MATERIALS

A. Form-Facing Materials: Materials for form faces in contact with concrete shall meet the following requirements:
1. Rough Form Finish (concealed concrete): No form-facing material is specified.
2. Smooth Finish (exposed concrete): APA HDO Plyform.
3. Formwork shall suit layouts indicated on Drawings.
a. Thickness sufficient to support concrete at rate poured. Reuse of cleaned, undamaged formboards permitted as indicated in Paragraph 3.07 below.

2.03 ACCESSORIES

A. Formwork Accessories: Commercially manufactured formwork accessories that are partially or wholly embedded in concrete, including but not limited to following:
1. Manufacturers: Greenstreak, or approved.
2. Chamfer Strips: As required to achieve profile indicated; wood or PVC.
3. Control Joint Strips: PVC.

B. Form Ties: Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties. Strength to be consistent with spacing, placement rate and the like.
1. Wood spacers, site fabricated form ties, and wire ties are not acceptable.
2. Strength and length as required for conditions of the installation.

2.04 EMBEDDED ITEMS

A. Anchor Bolts (for attached items, exposed to weather): Unless noted or otherwise indicated, material shall be ASTM A307, hot-dip galvanized in accordance with ASTM A153. See Structural Drawings for anchor bolt diameters and embedments required.

B. Inserts, Frames, Sleeves, and the Like:
1. Heavy gauge ferrous metal, hot dipped galvanized in accordance with ASTM A653. Size and shapes as indicated, or required.
2. Embedded steel weld plate with anchors, galvanized at conditions where adjacent materials are galvanized.

C. Joint Formers: As manufactured by Greenstreak, or accepted.
1. Keyed Cold Joints: Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
2. Expansion Joint Filler: Standard pre-molded expansion joint filler conforming to ASTM D994, D1751, or D1752, 1/2 inch thickness, unless otherwise indicated.
3. Weakened Plane Joint: Size as required for embedment of 1/4 of the slab thickness.

D. Sealant and Backer Rod: See Section 07 92 00, Joint Sealants.

E. Waterstops: See Section 03 30 00, Cast-In-Place Concrete.

F. Other Embedded Items and Accessories: Provide and install sleeves, inserts, anchors, reglets, dovetail anchor slots, other items indicated and as required to properly complete the installation including other trades work.

2.05 FORM COATINGS

A. Formwork Release Agents: Commercial formulation, low VOC, silicone-free form-release agent, to suit conditions of application which will not bond with, stain, or leave film residue, or adversely affect concrete surfaces,
   1. Manufacturer/Product: To suit type of form material.
      a. Nox-Crete “Crete-Lease VOC-880",
      b. US Mix "US SPEC Ezkote Green",
      c. W.R. Meadows Sealtight "Duogard II",
      d. Or approved,
   2. Confirm that form coating agent will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, and not impede wetting of surfaces which will be cured with water, steam, or curing compounds.

PART 3 - EXECUTION

3.01 GENERAL

A. Forms are Contractor’s responsibility. Lay out formwork in accordance with reviewed layout and shop drawings, and install in accordance with component manufacturers’ directions.
   1. Construct formwork and shoring in accordance with ACI 318 Chapter 6, ACI 347 and IBC Section 1906, whichever is the most stringent.
   2. Conform to shapes and dimensions shown; construct accurately. Provide square edge corners where indicated.
   3. Install accessories and components in accordance with manufacturers’ directions.

3.02 CONSTRUCTION

A. Formwork Construction - General:
   1. Construct accurately; brace to be unyielding; make tight to prevent leakage.
   2. Tolerances: Construct formwork so concrete surfaces conform to ACI 117 limits.
   3. Maximum Spacing:
      a. Studs and joists not farther apart than 12 inches o.c.
      b. Horizontal form walers spaced not to exceed 24 inches o.c.
   4. Slope to Drain / Flat Work: Construct so surfaces drain properly. See Drawings.
   5. Compensate (camber) for anticipated deflections listed in the Structural Drawings
   6. Provide positive means of adjustment (wedges or jacks) for shores and struts. Make adjustments in the formwork prior to concrete placement. Fasten form wedges in place after final adjustment of forms.
   7. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral movements of the formwork system during concrete placement
   8. Keep forms moist prior to pour to prevent shrinkage and warping.
   9. Position and support expansion joint materials, waterstops, and embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.
   10. Provide temporary openings at the base of column and wall formwork and at other points where necessary to facilitate cleaning and inspection. Locate such openings in where concrete surfaces will be concealed by other materials or construction.
      a. Inspect clean-out openings in bottoms of forms immediately before concrete is placed. Close openings prior to pour. Closure joints shall not be apparent at exposed concrete conditions.
   11. Construct formwork to permit easy removal. Construct formwork for wall openings to

facilitate removal and to counteract swelling of wood formwork.

12. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign materials before concrete is placed. During cold weather, do not use deicing salts or water to remove ice.

3.03 TREATMENT OF FORMS

A. Coat form contact surfaces with form-coating compound before placement of reinforcement. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcement. Apply in conformance with coating manufacturer's instructions.

B. Coat steel forms with specified non-staining, rust-preventative form coating. Protect against rusting. Rust-stained steel formwork is not acceptable.

3.04 MISCELLANEOUS EMBEDDED ITEMS

A. General: Place sleeves, inserts, anchors, and embedded items required for adjoining work or form support of adjoining work, and provide openings required for other trades, including mechanical and electrical, before concrete placement.

B. Anchor Bolts and Weld Plate Embeds: Locate and set in place items which will be cast directly into concrete. All items shall be positioned and secured prior to pouring concrete. "Wet set" embedded items are not allowed.
   1. Aluminum shall not be embedded in structural concrete.

C. Inserts, Sleeves, Conduit, and the Like:
   1. Allow all trades and contractors time and facilities to install such items.
   2. Conform to Chapter 6 of referenced ACI 318 and IBC 1906.3.
   3. Furnish and install sleeves and frames for openings indicated or required for equipment. For sleeves required for Mechanical and Electrical Work, see Divisions 22, 23, and 26.
   4. See Structural Drawings for limitations on locations.
   5. Sleeves shall not be placed in slabs in the vicinity of columns unless specifically directed by the Architect or indicated on the Structural Drawings.

3.05 JOINTS AND STOPPAGES

A. See Section 03 30 00, Cast-in-Place Concrete, for waterstops at below-grade joints.

B. Keyed Control or Construction Joints in Slabs on Grade: Provide key at construction joints where indicated.

C. Control Joints and Expansion Joints in Slabs on Grade: Saw cut as detailed or required. Locate where indicated or directed.
   1. Material: See requirements this Section.

3.06 REMOVAL OF FORMWORK

A. 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 for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
   1. Schedule form removal to maintain surface appearance that matches accepted mockups, where exposed and or required.

B. Formwork Supporting Weight of Concrete: Leave in place at least 7 days after concrete placement and until concrete design compressive strength is attained.
   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of 28-day design compressive strength.

C. When removal of formwork is based on concrete reaching a specified compressive strength, concrete will be presumed to have reached this strength when test cylinders, field cured the same as the concrete they represent, have reached the compressive strength specified for removal of formwork.
   1. If a lower compressive strength is proposed for removal of formwork and or shoring, submit detailed plans for review and acceptance. When shores and other vertical supports are arranged to allow the form-facing material to be removed without loosening or disturbing the shores and supports, the facing material may be removed at an earlier age.

D. Shoring and Reshoring:
   1. Provide as required for reinforced concrete structural components.
   2. Erect shoring and reshoring so that forms may be removed without disturbing adjacent shoring and formwork.
   3. Leave shoring in place until supporting concrete has reached 28-day strength.

E. Removal of Formwork:
   1. Inaccessible forms: Remove forms except where specifically indicated to remain.
   2. Prevent deflection and spalling concrete surfaces during removal of form ties.
   3. When finishing is required, remove forms as soon as removal operations will not damage concrete.
   4. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform needed repairs or required treatments at once, and follow immediately with specified curing.
   5. Loosen wood formwork for wall openings when this can be accomplished without causing damage to the concrete.

3.07 REUSE OF FORMWORK

A. Forms for Reuse: Where applicable, construct and erect forms for reuse; remove fins and laitance; withdraw all projecting nails and other objects from contact surfaces before reusing; clean and completely recondition all forms prior to reuse. Apply new form-release agent. Obtain approval for form reuse from the testing agency; formwork with patches and repairs affecting the appearance of concrete surfaces will not be allowed.

B. See Section 03 30 00, Cast-in-Place Concrete for repair of formed surfaces.

3.08 FIELD QUALITY CONTROL

A. Conduct special inspection to verify conformance with Specifications and Drawings.
   1. Inspect forms for location, design, configuration, and seal of form joints and ties.
   2. Check condition of bond surfaces, locations and sizes of embedment items, and anchorage for prevention of displacement.
   3. Coordinate with testing laboratory services in accordance with Section 01 45 23, Testing and Inspecting Services.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Materials, fabrication, placement, and tolerances for concrete reinforcing including steel reinforcement bars and welded wire reinforcing, and accessories.

B. Related Sections:
1. Section 01 45 23 - Testing and Inspecting Services
2. Section 03 10 00 - Concrete Formwork
3. Section 03 30 00 - Cast-in-Place Concrete
4. Section 05 05 99 - Welding

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ACI 117	Standard Specification for Tolerances for Concrete
ACI 301	Specification for Structural Concrete
ACI 315	Details and Detailing of Concrete Reinforcing
ACI 318	Building Code Requirements for Structural Concrete and
ACI 318R	Commentary
ASTM	Standards indicated herein
AWS D1.4	Structural Welding Code - Reinforcing Steel
CRSI	Manual of Standard Practice (MSP)
IBC	International Building Code, with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-Construction Meetings: Convene to review steel reinforcing installation, Special inspection and testing and inspecting agency procedures for field quality control.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 10, Submittal Procedures and Section 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each product specified. Include specifications and installation instructions for each proprietary material and each reinforcement accessory.
2. Shop Drawings: Comply with ACI SP-066.
a. Include placing drawings that detail fabrication, bending, and placement.
b. Include elevations showing vertical and horizontal reinforcing layout; special reinforcement at lintels and jambs at doors, windows and mechanical openings.
c. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
d. Show embed plates, bolts, and the like, for purposes of checking for potential interferences.
e. Indicate locations of construction joints in the concrete construction.
3. Material Test Reports:
a. Steel Reinforcement: Manufacturer’s mill test reports that materials meet structural and specification requirements.

b. Mechanical Splice Couplers: Current ICC-ES Reports for threaded or sleeve-type splices to verify compliance with specified requirements.
4. Field Quality Control Reports.
5. Qualifications Data: For welders.

1.05 QUALITY ASSURANCE

A. Welder Qualifications: Welders shall be AWS/WABO qualified in the last twelve months, in accordance with AWS D1.4. Welding procedures qualified by others and welders qualified by another employer may be acceptable as permitted by AWS D1.4. If re-qualification is required, the cost of these qualification tests shall be borne by Contractor.
1. See also, Section 05 05 99, Welding.

B. Perform work in accordance with CRSI, ACI 301, and IBC.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Bundles of reinforcing bars delivered to the site shall be tagged showing quantity, grade, size, and suitable identification of steel, to allow checking, sorting, and placing. Identification of steel shall be maintained after bundles are broken.
a. Bundles of flat sheets and rolls of welded wire fabric shall be tagged showing quantity, style designation, width, length and other information corresponding to markings shown on placement diagrams. Use metal tags.
2. Store concrete reinforcing materials at site to prevent damage from rust.
3. Store reinforcing steel off the ground in a manner that will prevent bending and be protected from earth, oil, or any other material that might impair bond to concrete.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC.
2. Special Inspection and Testing: Concrete work is subject to special inspection and testing. Comply with provisions of IBC, and ACI standards. See also, Section 01 45 23, Testing and Inspection Services, and Structural General Notes.
a. Conform to more stringent requirements where in conflict.

2.02 REINFORCING STEEL

A. General:
1. See Structural General Notes and Structural Drawings.
2. Material shall be unpainted, uncoated free from rust, dirt, and loose scale, unless otherwise indicated.

B. Reinforcing Bars: ASTM A706, Grade 60 deformed and plain low-alloy steel, unless otherwise indicated.
1. See requirements for other types and Grades on Structural General Notes.
2. Factory mark with size and grade.

C. Welded Wire Reinforcement: ASTM A1064.
1. Welded wire fabric mesh; type, material finish and wire sizes as noted on Structural General Notes and Drawings.
2. When used in slabs, provide flat sheets, not rolls.

2.03 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A706, Grade 60 deformed and plain low-alloy steel bars, cut true to length with ends square and free of burrs.

B. Couplers, Terminators, Form Savers and the Like: See Structural General Notes.

C. Supports: Detail supports in conformance with the requirements of reference standards ACI and CRSI MSP Bar Support Classifications for conditions of installation.
   1. Include necessary devices for proper placing, spacing, supporting and fastening reinforcement.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
   1. Manufacture supports from steel wire, plastic, or precast concrete according to CRSI Manual, of greater compressive strength than concrete, and as follows:
      a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
   2. Design sizes and shapes as required to maintain strength and support of reinforcement during placement of concrete.
   3. Use standard steel chairs and bolsters where concrete bottom surface concealed.
   4. Where legs of wire bar supports contact forms, use gray, all-plastic, or CRSI Class 1, gray, plastic-protected bar supports.

E. Tie Wire: ASTM A1064, annealed steel, not less than 0.0508 inch diameter.

2.04 FABRICATION

A. Reinforcing: Fabricate and detail to shapes and dimensions shown on Drawings in accordance with CRSI MSP and with fabricating tolerances in accordance with ACI 117.

B. Welding: Welding or tacking of reinforcing bars is not permitted unless specifically indicated in the Contract Documents. When welding of reinforcing is indicated and required, provide welds in accordance with AWS D1.4. See also, Section 05 05 99, Welding.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Conform to ACI standards, code requirements, provisions of the Contract Documents and following:
   1. Detail, fabricate and place reinforcing steel in accordance with ACI 315 and ACI 318.
   2. When concrete is placed, reinforcing shall be free of materials deleterious to bond.
   3. Reinforcing: Place accurately, support, and fasten reinforcing as indicated in the Contract Documents and reviewed Shop Drawings.
      a. Install spacer bars and tie intersections in accordance with the most stringent practices. Prevent displacement.
      b. After cutting tie wires, turn wires to the inside of section and bend so that concrete placement will not force ends to exposed concrete surfaces
   4. Do not exceed placing tolerances specified in ACI 117 before concrete is placed. When necessary to move reinforcement beyond the specified placing tolerance to avoid interference with other reinforcement or embedded items, submit the resulting arrangement of reinforcement for approval by Architect.

5. Typical clear distance between bars not less than nominal diameter of bars; not less than 1-1/3 times maximum size of coarse aggregate; and not less than 1 inch. Clear distance is clear distance between a contact splice and adjacent splices or bars.
6. Where reinforcement placed in two or more parallel layers:
   a. Clear distance between layers not less than 1 inch.
   b. Bars placed in upper layers directly above those in bottom.
7. Stop reinforcement at control and construction joints as detailed.
8. Do not drive nails in forms for supporting steel.
9. Place and secure stubs and other projecting bars before pouring.
10. Consult with Architect for instructions where reinforcing conflicts with conduit, piping, inserts, sleeves, and the like.
11. Reinforcing shall not be field bent or straightened except when specifically permitted.
    a. Bend no bars around openings or sleeves.
    b. Bars initially bent shall not be rebent at same location.
    c. No bars partially embedded in hardened concrete shall be field bent without approval of the Architect, unless otherwise indicated on Structural Drawings.
12. Reinforcing shall not be cut in the field except when specifically permitted.
13. Provide corner bars per the Structural Drawings at wall intersections.
14. Prevent water from softening soil at footings during steel placing.

3.02 SPLICES

A. Mechanical Splices: Make splices as indicated in the Drawings in accordance with the recommendations of the manufacturer of the mechanical splicing device. Conform to ACI 318 as modified by IBC, and as specified in Structural General Notes.
   1. Reinforcing splices not indicated on Drawings: Review location with Architect and Engineer; receive approval prior to use.

3.03 WELDING

A. No welding of reinforcing permitted except as indicated in General Notes on Structural Drawings. Types of welding other than as indicated on General Structural Notes and Drawings must receive written approval of Architect. See also, Section 05 05 99, Welding.
   1. No welding at bend in bar.
   2. Welding of crossing bars not permitted.

3.04 WELDED WIRE REINFORCING FABRIC

A. Slabs on Grade (where indicated): Extend welded wire reinforcement fabric to within 2 inches of the concrete edge. Lap edges and ends of fabric sheets a minimum of one mesh spacing plus 2 inches, or 10 inches.

B. Slabs on Deck: Provide steel fabric reinforcing in slabs over metal decking unless other reinforcing indicated. Extend steel fabric reinforcing to within 2 inches of the concrete edge. Lap edges and ends of sheets a minimum of one mesh spacing plus 2 inches, or 10 inches.

C. Provide elsewhere, where indicated on Drawings.

D. Support: Support welded wire reinforcing so that it is embedded at midpoint of slabs, unless indicated otherwise. Support steel fabric reinforcing during placing of concrete to ensure required position in the slab. Do not place welded wire fabric on grade or deck and subsequently raise into position in concrete.

E. Laps: Unless otherwise indicated or shown, overlap at splices not less than 8 inches for side and end laps.

3.05 PROTECTIVE COVERING

A. Protective Covering of Concrete Over Reinforcement: Refer to Structural General Notes.

B. Tolerances on concrete cover shall meet the requirements of ACI 117.

3.06 FIELD QUALITY CONTROL

A. General: The following reinforcing steel work will be considered defective and shall be removed and replaced by the Contractor at no additional cost to the Owner:
   1. Bars with kinks or bends not shown on Drawings.
   2. Bars injured due to bending or straightening.
   3. Bars heated for bending.
   4. Reinforcing not placed in accordance with the Drawings and/or Specifications.

B. Testing and Inspection: Verify conformance as required in Section 01 45 23, Testing and Inspection Services, for testing laboratory services.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Cast-in-place (CIP) concrete including but not limited to:
a. Concealed concrete, including foundations, stem walls, beams, reinforced concrete shell on inside of chimney, and miscellaneous concrete work.
b. Interior slab-on-grade, and concrete-filled metal decking at Mezzanine.
c. Include miscellaneous concrete required by other trades.
2. Concrete mix design.
3. Concrete placement procedures.
4. Concrete finishing.
5. Concrete curing.
6. Repair and patching of surface defects.

B. Related Sections:
1. Section 01 45 23 - Testing and Inspection Services
2. Section 02 41 19 - Selective Building Demolition: demolition of existing slab
3. Section 03 10 00 - Concrete Formwork
4. Section 03 20 00 - Concrete Reinforcing
5. Section 07 19 00 - Water Repellent and Graffiti Resistant Coatings
6. Section 07 26 16 - Below Grade Vapor Retarders

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ACI 117	Standard Specification for Tolerances for Concrete
ACI 301	Specification for Structural Concrete for Buildings
ACI 302.1	Guide for Concrete Floor and Slab Construction
ACI 304	Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305.1	Standard Specification for Hot Weather Concreting
ACI 306.1	Standard Specification for Cold Weather Concreting
ACI 308.1	Standard Practice for Curing Concrete
ACI 309	Recommended Practice for Consolidation of Concrete
ACI 311.4	Guide for Concrete Inspection
ACI 318	Building Code Requirements for Structural Concrete and Commentary
ACI 347	Guide to Formwork for Concrete
ASTM	Standards indicated herein
CRSI	Manual of Standard Practice
NRMCA	National Ready Mixed Concrete Association
IBC	International Building Code, with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate requirements for curing, forming, flatness/levelness, other characteristics, and testing required by floor finishing process and finish flooring manufacturers.
2. Coordinate embedments, recesses, templates and the like required by other sections.

B. Pre-installation Meeting: Convene before submitting design mixes, to review following:

1. Submittals and certifications.
2. Review proposed concrete mix design.
3. Procedures for ensuring quality of concrete materials, placement and finishes.
4. Curing and finishing limitations.
5. Review detailed conditions including tie-in to existing conditions,and joints.
6. Field quality control, and testing and inspections.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 10, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data and Samples:
   1. Product Data: For each material and product specified.
   2. Concrete Mix Designs: Do not begin concrete production until concrete mix designs have been reviewed and accepted. Mix designs shall include proportions of all ingredients, including admixtures added at time of batching or at job site. Submit the concrete mix design to the local building officials where required.
      a. Test records for each proposed mix design per ACI 318.
      b. Aggregates: Types, pit or quarry locations, producers' names, gradings, specific gravities, certification and evidence demonstrating compliance with specification.
         1) Base aggregate weights on saturated surface dry conditions.
      c. Admixtures: Types, brand names, producers, manufacturer's technical data, and certification data. Include fibrous reinforcing type, fiber length and dosage rate.
      d. Cement type and certification, fly ash and slag type and certification, total cementitious materials, water/cementitious materials ratio, and water source.
      e. Slump.
      f. Air content of freshly mixed concrete.
      g. Concrete compressive strength: Submit at 7, 28 and 56 days when specified.
      h. Chloride ion content of concrete.
   3. Curing Methods: Written methods, procedures, and products for curing for concrete walls and slabs. Proceed with curing methods only after acceptance by Architect.
   4. Repair Methods: Proposed methods of repair, along with repair material specification, manufacturer's data on the proposed patching material, preparation and application.
   5. Methods of cleaning concrete equipment.
   6. Shoring/Reshoring Schedule: Proposed schedule and sequencing of stripping formwork shoring removal and installing and removing shoring.
   7. Records: Records of concrete poured, including exact mix proportions, slumps, test strength, date, time, location of the placement, weather conditions at time of placement, and the source of concrete to Architect and Building Official.
      a. PDF of trip tickets at Substantial Completion.
   8. Qualifications Data: For concrete producer and contractor.

1.05 QUALITY ASSURANCE

A. Concrete Producer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94. Producer shall be certified according to the NRMCA's Certification of Ready Mixed Concrete Production Facilities.

B. Concrete Contractor Qualifications: An experienced concrete contractor with completed concrete Work 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.

C. ACI Publications and Standards: Comply with requirements of ACI standards indicated herein, unless more stringent provisions are indicated.
   1. Conform to ACI 305.1 and ACI 306.1 for concreting during hot and cold weather.

D. Maintain records verifying materials used are of the specified and accepted types and sizes and are in conformance with the Contract Documents.

E. Single Source Responsibility: Provide materials for concrete work made or produced from a single source of supply; no mixing of brands or types of cement will be allowed; no substitution of aggregate type or size from those accepted will be permitted.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver site applied materials, such as joint and curing materials, in original factory packaging and unopened containers and protect from damage and contamination.
   2. Cementitious Materials: Store in dry, weather-tight buildings, bins, or silos.
   3. Aggregates: Avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates to drain freely. Do not use if frozen.
   4. Admixtures: Protect against contamination, evaporation, or damage. Protect liquid admixtures from temperature changes that will adversely affect their characteristics. Do not use products stored beyond the manufacturer's recommended shelf life.
   5. Place concrete within the time limits specified. Ensure that concrete possesses the specified characteristics in the freshly mixed state at the point of placing.

1.07 PROJECT SITE CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures.
   1. Maintain concrete mix within temperature limitations at time of placement.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 305.1 when hot weather exists that could seriously impair the quality and strength of concrete.
   1. Maintain concrete mix within temperature limitations at time of placement.
   2. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC.
   2. Special Inspection and Testing: Concrete work is subject to special inspection and testing. Comply with provisions of IBC, and ACI standards. See also, Section 01 45 23, Testing and Inspection Services, and Structural General Notes.
      a. Notify the Testing Agency at least 48 hours before inspection is required.

2.02 CONCRETE MATERIALS

A. Conform to Drawings, Structural General Notes on Structural Drawings, and Specifications.
   1. Comply with ACI 301 unless modified by Contract Documents.

B. Cementitious Materials:
   1. Portland Cement: ASTM C150, Type II, gray, unless noted otherwise.
      a. Cement shall be same production and type and from same plant of manufacturer as cement used in the concrete used in the trial mixtures.

C. Aggregates:
   1. Conform to requirements of ASTM C33 for fine and coarse aggregate.
   2. Provide aggregates from a single source with at least 10 years' satisfactory service in similar applications using similar aggregates and cementitious materials.
   3. Aggregates shall be free from any substance that may be deleteriously reactive with alkalis in cement in an amount sufficient to cause excessive expansion of concrete.
   4. Coarse Aggregate: Maximum 3/4 inch, uniformly graded.

D. Water: ASTM C94, Use clean, fresh, and potable.

E. Admixtures: In accordance with Structural General Notes and following:
   1. The use of admixtures shall be the responsibility of the Contractor. Provide admixtures produced and serviced by established, reputable manufacturer, used in compliance with manufacturer's recommendations.
   2. Verify that all admixtures used are from same manufacturer and compatible in combination with the cement and aggregates. Provide only one brand of each type of admixture. Do not use accelerating admixtures. Unless accepted by Owner and Architect, admixtures shall be free of calcium chloride and thiocyanate (not more than 0.05 percent chloride ions).

2.03 CURING

A. Water Curing: Potable or complying with ASTM C1602.

B. Sheet Materials: Comply with manufacturer's installation instructions.
   1. Absorptive Cover: AASHTO M182, Class 2, jute or kenaf burlap cloth 9 oz/sq yd (dry).
   2. Moisture-Retaining Cover: White Burlap Polyethylene sheeting that meets or exceed ASTM C171, non-staining, moisture retentive.
   3. Curing Paper: Reinforced Kraft Curing Paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.

C. Curing Compounds and Cure-and-Seal Compounds: Clear, waterborne, membrane forming compounds. Locations only where specifically accepted by Owner and Architect.

D. Water-Repellent Coatings: For slabs to receive water repellent treatment, coordinate curing with requirements of water-repellent coatings specified in Section 07 19 00, Water Repellent and Graffiti-Resistant Coatings.

2.04 RELATED MATERIALS

A. Waterstop (where indicated): Cetco "Awkstop", Adeka "UltraSeal", or approved.
   1. Provide manufacturer's primer for installation of waterstops.

B. Vapor Retarders: See Section 07 26 16, Below Grade Vapor Retarders.

C. Grout: See General Structural Notes on Structural Drawings.

D. Bonding Agents: See Structural General Notes.
   1. Epoxy-Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements,

Structural General Notes, and following:

a. Type I or II, non-load-bearing, as suitable for bonding freshly mixed concrete to hardened concrete.
b. Types IV and V, load bearing, as suitable for bonding hardened or freshly mixed concrete to hardened concrete.

E. Construction/Control Joints, Expansion Joints/Premolded Joint Filler: See General Structural Notes, and Section 03 10 00, Concrete Formwork.

F. Water Repellent Coatings: As specified in Section 07 19 00, Water Repellent and Graffiti-Resistant Coatings.

G. Protective Materials for Finished Slabs: Protective sheeting “Seekure” by Fortifiber, plywood sheets, and to suit conditions of installation.

2.05 PROPORTIONING AND DESIGN REQUIREMENTS OF CONCRETE MIXES

A. General:
1. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
   a. Use independent testing agency to prepare and report proposed mix designs.
2. Provide concrete that has 28-day compressive strengths that exceed the specified design strength (f’c) in accordance with ACI 301 and Structural General Notes.
3. Provide slumps required at the point of placement into the structure.
4. Use admixtures in accordance with manufacturer’s directions.
5. Fully executed and signed trip tickets shall accompany each load and shall be logged in at the job site by the inspector with the time of entry.
6. Do not retemper concrete that has taken its initial set, nor add water to the mix.

B. Concrete Mixes: Conform to requirements indicated on Structural General Notes.
1. Compressive Strength of Concrete (at 28 Days): See Structural General Notes.
2. Total Cementitious Material: See Structural General Notes.
3. Water/Cementitious Material (W/C) Ratio: Shall be established by the accepted mix design water/cement ratio as required by IBC.
4. Air Content: See Structural General Notes.
5. Slump Limit: Contractor shall determine slump. Each concrete mix submitted shall specify the slump. Slump tolerances shall meet ACI 117.
6. Admixtures: Admixtures such as superplasticizers, water reducers, or set retarding agents to provide special properties to the concrete. See Structural General Notes.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the Owner. New field data, data from new trial mixtures, or evidence that indicates that the change will not adversely affect the relevant properties of the concrete shall be submitted for acceptance before use.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Verify that formwork, reinforcing, and embedded items are accurately and securely placed, clean, water and frost free, and ready to receive concrete.
2. Ensure that vapor retarder specified in Section 07 26 16, Below Grade Vapor Retarders, is installed per manufacturer's instructions and undamaged.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Do not place concrete until required submittals are accepted.

B. Substrates and Conditions:
1. When the ambient temperature necessitates the use of cold or hot weather concreting, make provisions in advance of concrete placement.
2. Do not begin placing concrete when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing.
3. Do not begin placing concrete while rain, sleet, or snow is falling unless adequate protection is provided. Do not allow rainwater to increase mixing water or to damage the surface of the concrete.
4. Remove snow, ice, frost, water, and other foreign materials from form surfaces, reinforcement, and embedded items against which concrete will be placed.
5. Place concrete on properly prepared and unfrozen sub-grade or forms and only in dewatered excavations and forms.
6. Do not allow mud or foreign materials into the concrete during placement operations.

C. New Concrete Cast Against Existing: Clean concrete with steel brush and apply bonding agent as instructed by manufacturer prior to placement of new concrete.

D. Reinforcement Doweled into Existing Concrete: Drill holes into existing concrete, place adhesive grout, and insert steel dowels.

E. Protect surrounding areas to preclude damage from work of this Section.

3.03 EMBEDDED ITEMS AND JOINTS

A. General: See Section 03 10 00, Concrete Formwork for embedded items required for other work that is attached to or supported by, cast-in-place concrete including, but not limited to expansion joints, joint fillers, waterstops, anchor bolts, embedded plates and anchor slots.

B. Waterstops: Install waterstops in strict accordance with manufacturer's instructions.
1. Install waterstops at cold joints in concurrent pours, joints between adjacent and/or adjoining pours, joints between new concrete pours abutting and/or adjoining existing concrete, pour joints between slabs, at penetrations through concrete pours, and other joints or penetrations as directed by Architect.
2. Position waterstop in joint or penetration according to manufacturer's specified clearances and cover requirements.

C. Joints:
1. Construction Joints - General: Locate construction joints where indicated on Drawings. Where not indicated, locate joints at location to least impair strength of structure. Review location of joints with Owner and Architect, and do not install without prior approval.
   a. Place reinforcing at joints per Structural Drawings and General Structural Notes.
   b. In slabs form true, straight lines with surfaces flush at joints.
2. Contraction (Control) Joints: Install where indicated or as directed. Hold down pre-molded joint filler to allow for sealant and backing, Section 07 92 00, Joint Sealants. Build into forms or saw cut as detailed or required.
3. Concrete Bond at Construction Joints: Remove laitance and defective concrete. Wash joints thoroughly prior to placing concrete. Thoroughly dampen surface but remove excess water from forms prior to placing concrete. Coat joint with specified

concrete bonding agent. Mix and apply in accordance with manufacturer's directions.

3.04 CONVEYING AND PLACING CONCRETE

A. Ready-Mix Concrete: Comply with requirements of ASTM C94. Monitor concrete temperature in the truck, and elapsed time from start of batching at plant to discharge at job site.
   1. Batch Tickets: Provide certificate signed by authorized official of supplier with each load of concrete. Include time the truck left plant; concrete mix; amount of water and cement in the mix; amount and type of admixtures; and time truck unloaded at jobsite.
      a. A truck without batch tickets will be rejected.
   2. Control of Mixing Water: No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch.
   3. Approved admixtures must be added at the appropriate time, within an accuracy of 3 percent, and in strict compliance with manufacturer's instructions.

B. Perform the work in accordance with provisions of the Contract Documents, IBC, and ACI Standards. Where these may be in conflict, the more stringent requirements govern.
   1. Cold Weather and Hot Weather Concreting: Comply with ACI 305.1 and ACI 306.1 standard practice, and Structural General Notes.
   2. Pre-Placement Inspection: Prior to concrete placement perform the following:
      a. Inspect and complete formwork installation and all reinforcing, and embed items. Notify other crafts to permit installation of their work.
      b. Ensure that reinforcing will be maintained in proper position during placement.
      c. Moisten wood forms immediately before placing concrete where form coatings are not used.
   3. Verify all dimensions and elevations prior to placement.

C. Conveying and Placing - General:
   1. Pour monolithically unless shown otherwise or accepted by Owner prior to placement.
   2. Deposit concrete as close as possible to its final position in the forms. There shall be no vertical drop greater than 4 feet except where suitable equipment is provided to prevent segregation and where specifically authorized.
   3. Regulate depositing of concrete to effectively consolidate in horizontal layers not more than 12 inches thick, except that slabs shall be placed in a single layer.
   4. Consolidate concrete with mechanical vibration per ACI 309. Vibrate as necessary to obtain thorough consolidation and complete filling of forms, eliminating air and stone pockets that may cause honeycombing, pitting, or planes of weakness. Slabs shall be consolidated by properly designed vibrating screeds or other accepted technique.
   5. Protect soil-bearing surfaces from softening during placing.
   6. Concrete Bond: Coat concrete and concrete topping, to be joined with concrete, with concrete bonding agent mixed and applied per manufacturer's instructions.
   7. Rate of placement in accordance with referenced ACI 347.

3.05 FINISH OF FORMED SURFACES

A. General: After removal of forms, give each formed surface one or more of the finishes described below. Conform accurately to shape, alignment, grades and section indicated.
   1. Unspecified Finishes: When Contract Documents do not specify a finish, finish surfaces as follows:
      a. Rough-form finish on concrete surfaces not exposed to public view.
      b. Smooth-form finish on concrete surfaces exposed to public view.

B. As-Cast Finishes: Coordinate finishes of "as-cast" concrete finishes with construction of formwork. Produce as-cast form finishes in accordance with the following requirements:

1. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material, with the holes and defects repaired and patched. Remove fins and other projections that exceed 1/2 inch in height.
2. Smooth-Formed Concrete: As-cast concrete texture imparted by form-facing material, arranged in symmetrical manner with minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections that exceed 1/8 inch in height.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.06 FINISHES FOR UNFORMED (SLAB) SURFACES

~~A.~~ General: Comply with ACI 117 and ACI 302.1 recommendations.
1. Finish slab surfaces in accordance with one of finishes indicated. Finish joints and edges with proper tools. Tool projecting or protruding edges of concrete.
2. Machine troweling permitted provided maximum specified tolerance is not exceeded.
3. Make sharp corner at wall to floor conditions.
4. Protect concrete requiring finishing, from rain or snow during finishing operations.
5. Perform scoring indicated; including control and expansion joints.

B. Placement: Place concrete at a rate that allows spreading, straightedging, and darbying or bullfloating before bleed water appears. Screed each slab and topping fill to true levels and slopes. At elevated slabs, set screeds to match camber in structural steel. Work surfaces as required to produce specified finish. Do no finishing in areas where water has accumulated; drain and re-screed. Use of dry cement and sand to absorb moisture and remove free water is prohibited.

C. Slab Tolerances: Finish slabs accurately to flatness and levelness tolerance indicated, as defined in ACI 117 straightedge method, measured after finishing and before removal of supporting formwork or shoring, to verify compliance with the tolerances. T Tolerances are based on mean floor elevations.
1. Take special care to finish slab level and true with the main area of the slab around conduit plumbing stacks, and the like.
2. Surface Variation Tolerances: Maximum 1/4 inch in 10 feet, straightedge method.

D. Finishes:
1. Steel Troweled Finish: Float and then power-trowel the concrete surface. Hand trowel the surface until smooth and free of trowel marks, uniform in texture and appearance, meeting tolerance indicated.
   a. Typical for slab-on-grade and elevated slabs at Boiler Building.

E. Defective Work: Remove and replace, when directed, slabs which show excessive shrinkage cracks, and any slabs which do not drain properly.

3.07 CURING METHODS

A. Concrete Curing - General:
1. Cure concrete using curing materials and methods accepted by Architect. Immediately after placement, protect concrete from premature drying, excessive heat or cold temperatures, and from mechanical injury.
   a. See ACI 305.1 and ACI 306.1 for hot weather and cold weather concreting.
2. Maintain the concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and to ensure the necessary strength development for structural safety.

a. If forms removed before end of curing period, continue curing for remainder of curing period by continuous fogging or sprinkling, covering with absorptive cover or water-retention sheeting. Use of curing compounds requires pre-approval.

B. Curing Methods:
1. Wet or Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
a. Ponding, continuous fogging, or continuous sprinkling.
b. Continuous application of steam (under 150°F)
2. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12 inch lap over adjacent absorptive covers.
3. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

C. Curing Formed Concrete Surfaces: Comply with ACI 308.1. Moisture cure for minimum of 7 days. Keep wood forms wet until they are removed.
1. If forms remain during curing period, moist cure after loosening forms.
2. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
a. Continuous fogging or sprinkling (maintain concrete surface continuously wet).
b. Absorptive Cover: Pre-dampen absorptive material; apply additional water to absorptive material to maintain concrete surface continuously wet.
c. Moisture-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping or lapping seams per manufacturer's instructions.
d. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller per manufacturer's instructions.

D. Curing Unformed Concrete Surfaces (interior slabs): Comply with ACI 308.1 Begin curing immediately after finishing concrete.
1. Wet-cure using water or water-fog-spray; or absorptive cover or moisture retaining cover (per manufacturer's instructions), for not less than 7 days.
a. Contractor shall be responsible for removing curing compound that remains on the substrate, in accordance with flooring material manufacturer's instructions.
2. Do not use curing compounds on slabs in the Boiler Building. Should curing compounds be applied, the Contractor shall use power scrubbers, industrial strength detergents, and fresh water rinse, or mechanical means if required, to remove them.

3.08 MISCELLANEOUS ITEMS

A. Fill around pipes and ducts passing through concrete floors and walls with Portland cement grout, unless otherwise indicated or directed. Penetrations exposed to weather exposures shall be dampproofed and sealed to ensure against leakage into interior spaces.
1. Grouts: Refer to Structural General Notes. Comply with manufacturer's requirements.

B. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Screed, tamp, and finish concrete surfaces with light broom finish unless indicated to receive a finished flooring or special finish process.

C. Saw-Cut Joints: See Structural General Notes. Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch and 3/8 inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

3.09 CONCRETE REPAIR

A. Defective Concrete: Repair and patch defective areas when accepted by Architect. Remove and replace defective concrete that cannot be repaired and patched to Owners' and Architects' satisfaction. Defective concrete includes but is not limited to the following:
   1. Concrete in which defective or inadequate steel reinforcing has been placed.
   2. Concrete incorrectly formed, or not conforming to details and dimensions on the Drawings or with the intent of the Contract Documents, or concrete where the surfaces are out of plumb or level.
   3. Concrete below specified strength;
   4. Concrete containing wood, cloth, or other foreign matter, or with rock pockets, voids, honeycombs, cracks, or cold joints not acceptable to Owner or Architect.
   5. Remove and replace at no cost to Owner.

B. Concrete Repair – General: Correct Work that does not conform to the specified requirements, including strength, tolerances, and finishes, or is defective and unacceptable to the Owner. Submit the proposed solution for review and approval.

C. Repair of Unformed Surfaces: Repair finished unformed surfaces that contain defects that affect durability of concrete, or do not drain properly. Surface defects include crazing, cracks in excess of 0.01 inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
   1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope.
   2. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days. Depth of removal shall not exceed 1/4 inch without scanning for reinforcing.
   3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage an independent inspection agency to perform field tests and inspections, and prepare testing and inspection reports including the reporting requirements of ASTM C31, ASTM C39, and ACI 301. See Section 01 45 23, Testing and Inspection Services.

B. Conduct special inspection during placing of concrete. Coordinate inspection services in conformance with Section 01 45 23, Testing and Inspection Services.

C. Clean concrete equipment including delivery equipment as submitted and accepted. Do not clean mixers on Owner's property or other property.

3.11 PROTECTION

A. Protect exposed finished floor slabs from damage, staining, laitance, and contamination by use of protection sheeting, plywood sheets, and to suit conditions of installation. Remove protective covers at Final Acceptance, unless requested earlier by Architect.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Precast reinforced concrete tread units with integral contrasting stripes, for interior stairs.
2. Pre-engineered units, or design by a qualified professional engineer licensed in the State of Washington.

B. Related Sections:
1. Section 05 12 00 - Structural Steel: stair stringers and tread structural support

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

Accessible Design	2010 Standards for Accessible Design (ADA)
ACI 318	Building Code Requirements for Structural Concrete
APA	Architectural Precast Association
ASTM	Standards indicated herein
PCI MNL	Manuals for Architectural Precast Concrete
IBC	International Building Code, with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate precast concrete units with structural stringers and other support, and with adjacent construction including cast-in-place concrete where indicated.

B. Pre-Installation Meetings: Convene to review conditions of installation and supports.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each product indicated.
2. Manufacturer’s specifications and installation instructions/erection drawings.
3. Shop Drawings: Include for each precast item and location indicated:
   a. Plans, elevations, sections/profiles, reinforcing, finish, contrasting stripe, and adjacent construction including stringers and structural support.
   b. Details of loose and cast-in fastening hardware, inserts, connections, joints, and accessories.
   c. Design Mix proposed for each type of concrete, include compressive strength.
4. Engineering Calculations: Calculations and Shop Drawings stamped and signed by a qualified engineer licensed in State of Washington, for pre-engineered precast units attachments to structure.
5. Test Reports: Test Reports indicating compliance with specification requirements. Submit also to building official, where required.
6. Material Certificates: Manufacturer's certification that materials meet specifications.
7. Samples: Prior to fabrication, submit for approval:
   a. One 12 inch length, full-size stair tread/riser with finish and contrasting nosing.
   b. Proposed shop-applied sealer for review and approval by Architect.
8. Qualifications Data: For fabricator and installer.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Shall be regularly engaged in the manufacture of precast concrete units conforming to industry standards, and the following:
   1. Shall be certified by NPCA, or other comparable program accepted by the Owner.
   2. Shall be able to provide engineering capabilities specified.

B. Installer Qualifications: Shall have a minimum of 3 years of experience in installing precast concrete systems similar in material, quality and design to those required for this Project.

C. Design Standards: Comply with ACI 318, and PCI standards, provisions and recommendations as applicable.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Protect and support precast concrete units during shipment. Verify undamaged condition at site.
   2. Store units protected from damage from staining and other physical damage.
   3. Lift and support units at designated lifting and supporting points directed by fabricator.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC including seismic requirements.
   2. Accessibility: Comply with 2010 Standards for Accessible Design (ADA).

B. Performance/Design Criteria:
   1. Delegated Design:
      a. Pre-Engineered Precast Units: Calculations by a professional Engineer licensed in State of Washington, for precast units including loads imposed on structure.
      b. For custom precast units, provide engineering calculations and Shop Drawings by a professional Engineer licensed in State of Washington, including reinforcing, accommodation of anchorage, and loads imposed on structure.
   2. Precast units shall resist loads within limits and under conditions indicated.
      a. Design Loads: Refer to Structural General Notes.
      b. Treads and connections shall support dead load of 40 plf, plus uniform live load of 100 psf or point load of 300 pounds.
      c. Maximum Deflection: L/720 of span without damage or permanent deformation.
   3. Coordinate anchorage of precast units to steel stair stringers indicated on Drawings. Changes to structure, changes in dimension or location of stringers, or changes to adjacent finish surfaces indicated are subject to prior approval by Architect.
   4. Where eccentric loadings are imparted to structural elements whose configuration cannot normally support such loads, provide structural design and additional reinforcement as necessary to resist these loads, and coordinate these anchorage requirements with Architect prior to fabrication.
   5. Maintain clearances, allow for fabrication and construction tolerances, accommodate live load deflection, temperature variation and thermal movement where applicable, and building movement including seismic.

2.02 MANUFACTURERS

A. Manufacturers:
   1. Puget Sound Precast.

2. Stepstone, Inc. Architectural Precast Concrete Products.
3. Wausau Tile Inc.
4. Or approved.

B. Products: Puget Sound Precast products indicated.

C. Substitutions: Submit substitution requests in accordance with Section 01 25 00 Substitutions and Product Options.

2.03 PRECAST CONCRETE STAIR TREADS

A. Precast Architectural Concrete Stair Treads: Puget Sound Precast “Closed Riser Stair Treads".
1. Description: Reinforced precast concrete units, with starter steps, and accessories required for complete installation. Minimum 4,000 psi compressive strength.
2. Profile: One-piece closed riser profile.
3. Sizes/Spans: As indicated on Drawings.
4. Thicknesses: Pre-engineered sizes selected, or thickness as determined by engineering calculations for spans and loads.
5. Nose: ADA-compliant.
6. Color: Manufacturer's standard color. .

B. Coordinate with stair stringers and tread support, and at landings as indicated.

2.04 MATERIALS

A. Concrete Materials: Manufacturer’s standard. See Section 03 30 00, Cast-in-Place Concrete for standards and additional information.
1. Portland Cement: ASTM C150.
2. Aggregate: ASTM C33, cleaned, properly graded to size.
3. Water: Clean, fresh and potable.

B. Reinforcement: Reinforce units with manufacturer's standard reinforcement suitable to pre-engineered spans and loads indicated; or as determined by engineering calculations for spans and loads. Comply with ACI/PCI and CRSI.

C. Steel:
1. Steel Plate ASTM A36.
2. Steel Sheet ASTM A1011(hot rolled).
3. For other shapes, standards, and galvanizing requirements, see Section 05 12 00, Structural Steel.
4. Steel Reinforcing: ASTM A615 or ASTM A706.

D. Form Materials: As required to cast units in the shapes indicated with smooth surfaces free of wood grain, joint lines, and other surface irregularities.

2.05 AUXILIARY MATERIALS AND ACCESSORIES

A. Structural Support: Coordinate with structural support at stringers indicated on Drawings.

B. Stair Nosings: Balco “P-Series”, or approved.
1. Description: Extruded mill finish aluminum cast-in stair tread nosing with continuous extruded aluminum anchor (no exposed fasteners), and black slip-resistant epoxy abrasive strips meeting ADA. 3 inches wide.

C. Sealer: Colorless, water-repellent penetrating sealer that will not darken or affect color of precast concrete or contrasting strip, recommended by precast manufacturer.

2.06 FABRICATION

A. Fabricate in conformance with PCI Standards.
   1. Use rigid molds, constructed to produce precast units uniform in shape, size, and finish without pocking, and free of voids or honeycombing.
   2. Maintain consistent quality during manufacture.
   3. Fabricate precast units with a minimum 28-day compressive strength indicated, and reinforcing to resist structural forces including transporting and handling stresses.
   4. Fabricate units straight, smooth, and true to size and shape, with exposed edges and corners precise and square unless otherwise indicated.
      a. Edges: Minimum 1/8 inch radius, lightly eased edge.
      b. Tread/Riser Front Edges: Comply with ADA.
   5. Fabricate precast units with cast-in nosings indicated.
   6. Fabricate units to accommodate supporting devices for anchorage to stair structure.
   7. Cure units by moisture retention without heat or accelerated heat curing using low-pressure steam or radiant heat and moisture, to develop concrete quality required.

B. Finished surfaces shall match approved control sample. Minor chips, hairline cracks, and slight variations in color and finish are normal in precast concrete.
   1. Discard precast units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by Architect.

C. Fabrication Tolerances: Maximum variation of 1/8 inch in unit length, width, and height.

2.07 FINISHES

A. Shop-Applied Finishes - Precast Architectural Concrete Units:
   1. Manufacturer’s standard broom finish.
   2. Shop-Applied Sealer: Shop-apply sealer to all surfaces, in accordance with sealer manufacturer's instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Installation – General: Install in accordance with provisions of the Contract Documents, IBC, and recommendations of fabricator.
   1. Stairs: Install accessories required for connecting precast units to supporting steel stair stringers, steel plate and sheet, gratings, and back-up construction, that comply with tolerances required by precast manufacturer.
   2. Provide bracing and shoring necessary to support the units before they are permanently attached to structure.
   3. Precast units shall be true to dimensions and have clean accurate arrises.
   4. Set precast units aligned, accurately, straight, level, plumb and square.
   5. Unit spacing and exposure shall be uniform throughout the extent of the stair.
   6. Maintain minimum 1/8 inch joint between adjacent precast units.
   7. Secure precast treads/risers bolted to welded supports as detailed.

8. Set units dry without mortar or adhesive for interior stairs.

B. Installation Tolerances:
   1. Maximum Variation from Level: 1/8 inch in 10 feet length
   2. Maximum Variation from Location: Plus or minus 1/4 inch.

C. Remove shims and spacers from joints or non-load bearing units after fastening.

3.03 REPAIR

A. Damaged Precast Units: No patching of surfaces after installation allowed. Replace precast units unacceptable to the Owner with precast units that comply with requirements.

B. In-place precast concrete units may be rejected for any of the following reasons:
   1. Pieces not meeting design strength requirements.
   2. Pieces exceeding specified installation tolerances.
   3. Pieces damaged during construction operations.
   4. Pieces exposed to view which develop surface finish deficiencies including blemishes and color variations exceeding acceptable limits/samples.
   5. Unrepairable damage of any component parts to Architect's requirements.

3.04 CLEANING

A. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes.

B. After installation, clean soiled precast concrete surfaces with detergent and water, using fiber brush and sponge, and rinse thoroughly with clean water.
   1. Use only other products recommended by manufacturer to clean particularly stubborn stains after more conservative methods have been tried unsuccessfully.
   2. Rinse thoroughly with clean water immediately after using cleaner.
   3. Leave surfaces clean, ready to receive joint sealants.

END OF SECTION

DIVISION 04
MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Hot water pressure restoration cleaning of existing brick, cast stone, and concrete.
2. Removal of excess mortar.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 01 43 39 - Mock-Up Requirements
4. Section 04 01 20.91 Masonry Restoration
5. Section 07 19 00 - Water-Repellents and Graffiti-Resistant Coatings
6. Section 07 92 00 - Joint Sealants

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

MIW	Masonry Institute of Washington, The Northwest Masonry Guide
NPS Standards	The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate cleaning of brick with restoration work specified in Section 04 01 20.91.
2. Coordinate with Section 07 19 00, Water-Repellents and Graffiti-Resistant Coatings.

B. Pre-Installation Meetings: Combine with Pre-Installation Meeting for Masonry Restoration. Convene to review combined quality-control program and Restoration Plan for cleaning and restoration, and to examine conditions for compliance with requirements.

C. Sequencing and Scheduling: Cleaning methods shall follow routing of joints to be repaired, and prior to repointing. Include review and approval of mock-ups on Construction Schedule.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Quality Control (QC) Restoration Plan: Coordinate cleaning requirements of this Section with QC Restoration Plan specified in Section 04 01 20.91.
2. Test Data: Manufacturer's test data indicating compliance with specifications.
3. Qualifications Data: For masonry specialist.

1.05 QUALITY ASSURANCE

A. Manufacturer's technical representative shall provide substrate evaluation, observe mock-ups, and be available during application for consultation and observation.

B. Historic Masonry Cleaning Specialist Qualifications: Same historic masonry specialist as specified in Section 04 01 20.91, Masonry Restoration.

C. Standards: Comply with BIA, MIW and NPS Standards, Technical Notes, and Guidelines.

D. Mock-Ups/Sample Panels: Prepare mock-ups to demonstrate standard of workmanship. Notify Owner and Architect 5 days prior to beginning mock-ups.
   1. Locations as directed by Architect. Mask off adjacent surfaces.
   2. Cleaning of Existing Brick, Cast Stone, and Concrete. Mock-up minimum 4 foot x 4 foot area test section for each brick each elevation, and minimum 4 foot length of cast stone parapet cap, and 4 foot length of concrete sill.
      a. Low-Pressure Water Spray: Test each at 100-psi water pressure.
      b. Coordinate with restoration work specified in Section 04 01 20.91.
   3. Obtain approval before beginning application, and maintain mock-ups during construction, as a standard for judging the work.
   4. Approved mock-ups may become part of the completed work if undisturbed at the time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Storage: Keep materials protected from weather until use. Store in out of direct sunlight, in cool dry storage area, and accordance with manufacturer's instructions.
      a. Maintain temperature of between 40 and 100 deg F for storage of materials.
      b. Do not install at temperatures below 40 deg F.

1.07 PROJECT SITE CONDITIONS

A. Environmental Requirements:
   1. Perform cleaning at surface and air temperature of minimum 40 deg F (or within product manufacturers guidelines); and confirm weather forecast to ensure temperature will be maintained for curing period required by manufacturer.
   2. It is permissible to tent and heat to insure appropriate environmental conditions, but the enclosure must be humidified (minimum 70 percent relative humidity).
   3. Construction Cleaning and Disposal of Waste: Dispose of waste legally. Keep material out of sewers, storm drains, surface waters and soil.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC.
   2. Comply with requirements of Authorities Having Jurisdiction (AHJ) relating to VOC limitations, and legal disposal of waste.

B. Performance: Products used for cleaning mortar residue from the surface of masonry shall not change the appearance of the mortar or masonry surfaces

2.02 MATERIALS AND EQUIPMENT

A. Water Pressure Spray Cleaning:
   1. Equipment: Low-pressure spray equipment, fitted with temperature and pressure gauge at discharge wand end, and with fan tip spray nozzle recommended by cleaning product manufacturer.
   2. Use potable water.

B. Masking Materials: Prosoco "Sure Klean Acid Stop Strippable Masking", to protect metal and glass surfaces.

1. Do not use materials containing hydrochloric acid or other products harmful to the substrate and or adjacent surfaces.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Prior to beginning work, review mock-up test methods and panels accepted by Owner and Architect. Mock-ups shall be the standard for evaluation and judging of the work.

3.03 MASONRY CLEANING - GENERAL

A. Cleaning - General: The intent of the cleaning program is not to return the substrate to a pristine condition. Rather, it is to remove the excessive airborne deposition and organic growth and as required for the installation of sealant or mortar repointing at existing masonry joints.
   1. Remove moss, organic growth, dirt, dust, soot, effluorescence, and foreign materials.
   2. Remove all stains, without damaging the masonry surfaces.
   3. Cleaned surfaces shall be uniformly clean and free from foreign material; no streaks or noticeable variations.

B. While the following methods are acceptable for this project, variables necessitate that the chosen method be demonstrated to conform to the intent of this Section; and to set pressure and dwell time limits, where applicable, during the mock-up approval process.
   1. Cleaning with water.
      a. Spraying with water using a low pressure delivery system (*400 psi max*), allowing the water to saturate the surface deposition, then being rinsed off. See Article 3.04 below.
      b. Hand application of water utilizing a brush and gentle cleaning of the surface prior to rinsing.
      c. The cleaning techniques employed to this end shall be employed to not introduce significant amounts of water to moisture susceptible areas or to further contribute to the spalling and exfoliation of the brick.
      d. Where low pressure spraying is to be employed, associated remediation of the joints must be performed after the cleaning process.

3.04 WATER APPLICATION LOW-PRESSURE SPRAY CLEANING

A. Water Application – Low Pressure Spray Cleaning:
   1. Spray Application - General:
      a. Warm water shall be used with all cleaning work.
      b. Use warm water (no greater than 120 deg F) low pressure spray on masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume, and equipment.
      c. Using a fan tip spray nozzle; work from bottom to top so as not to produce streaks of soiling runoff.
      d. Unless otherwise indicated, hold fan tip spray nozzle no closer than 12-inches from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.

e. Hand scrubbing with soft, natural or synthetic brushes is allowed. The use of metal, or any abrasive tools permanently altering the existing masonry in an undesirable manner shall not be accepted.
   1) Do not brush areas indicated to be tooled for cleaning purposes.

2. Low Pressure Spray:
   a. Start at 50-psi and increase pressure as needed to achieve desired results, not to exceed 100-psi on test panels, 6 to 8 gallons per minute.
      1) Watch for deposition of sand particles below working area; an indication that too much pressure is being used.
   b. Final working pressure to be determined by results of test sections approved as Mock-Ups and included in the Quality Control Plan.

3.05 CLEANING

A. Cleaning:
   1. Remove masking materials.
   2. Remove debris and waste, including masonry waste, generated by Work of this Section, and legally dispose of off Owner's property.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Repair of existing brick:
   a. Pins, anchors, and helical wall tie anchoring systems for stabilizing masonry.
2. Mortar removal, joint preparation and repointing of existing brick in locations indicated on Drawings.
3. Removal of sealant and installation of sealant.
4. Completed work required shall match existing (original) work as closely as possible.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 01 43 39 - Mock-Up Requirements
4. Section 04 01 20.52 Masonry Cleaning
5. Section 05 01 99 - Restoration and Maintenance of Metals: steel headers in brick
6. Section 07 19 00 - Water Repellent and Graffiti-Resistant Coatings
7. Section 07 62 00 - Sheet Metal Flashing and Trim
8. Section 07 92 00 - Joint Sealants
9. Section 09 96 00 - High Performance Coatings

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
BIA	Brick Industry Association Technical Notes on Brick Construction
MIW	Masonry Institute of Washington, The Northwest Masonry Guide
NPS Standards	The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings • Preservation Brief No.2: Repointing Mortar Joints in Historic Buildings
IBC	International Building Code with City of Mercer Island amendments

B. Definitions:
1. Joint Remediation: The process of removing joint material, preparing the joint, and installing either sealant or mortar.
2. Repointing: The process of removing existing mortar from the masonry construction, preparing the existing masonry joint and repacking the joint with fresh mortar.
3. Scarify: The process of lightly scratching or abrading the masonry joint surfaces to promote adhesion of mortar or sealant.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate with cleaning and other preparation required prior to beginning work.
2. Coordinate masonry restoration process curing and access required for restoration of steel headers at openings specified in Section 05 01 99, and with application of coatings specified in Section 07 19 00, Water Repellent and Graffiti-Resistant Coatings, and sealants specified in Section 07 92 00, Joint Sealants.
3. Coordinate with roofing and sheet metal flashing impacted by work of this Section.

B. Pre-Installation Meetings: Combine with Pre-Installation Meeting for Masonry Cleaning. Convene to review:
   1. Quality-control program and Restoration Plan for cleaning and restoration of brick.
   2. Examine conditions for compliance with requirements, including flatness and attachment to existing substrates.
   3. Special conditions of other construction that will affect the work.

C. Sequencing and Scheduling: Coordinate with cleaning specified in Section 04 01 20.52. Cleaning methods shall follow routing of joints to be repaired, and prior to repointing.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
   1. Quality Control (QC) Restoration Plan: Submit Plan for approval prior to beginning work. Coordinate with cleaning requirements in Section 04 01 20.52. Indicate:
      a. Methods and equipment for cleaning brick.
         1) Restoration cleaning with cleaning products as determined by test panels.
      b. Process for brick repair including predrilling and preparation for helical ties.
      c. For items a-b above, indicate order in which each procedure will be performed.
      d. Methods of storing and protecting materials and adjacent areas during the Work.
      e. Methods keeping the Work areas clean, and for disposal of waste materials.
   2. Product Data: For each material and product required to perform work of this Section.
      a. Include manufacturer's recommendations for product application and use.
      b. Include SDS sheets (informational submittal).
   3. Shop Drawings: Plans, elevations and locations for the restoration work.
      a. Include provisions for expansion joints or other sealant joints.
      b. Include flashing, weeps, and accessories as required.
      c. Include locations of scaffolding and points of scaffolding in contact with masonry, and details of each point of contact or anchorage.
   4. Samples:
      a. Cured mortar samples having color and content to match existing or as selected.
      b. Sealant: Full range of standard and custom colors for Architect’s selection.
   5. Certificates (except where material is labeled with certification by material producers): Manufacturer's certificates that materials supplied comply with specified requirements.
   6. Laboratory Test Data: Preconstruction test data certifying performance for:
      a. Mortar mixes including compressive strength.
      b. Mortar has reached a compressive strength indicated.
   7. Qualifications Data: For masonry specialist.
   8. Warranty: Sample copies of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Historic Masonry Restoration and Repair Specialist Qualifications: Shall have a record of successful in-service performance completing work similar in material, design, and extent to that indicated for this Project for a minimum of 5 years. See also, Article 2.02 below.
   1. Experience in only installing masonry is insufficient experience for masonry repair work.
   2. Shall demonstrate ability to perform each mortar repointing joint profile in a mock-up.
   3. Shall also be responsible for the cleaning and restoration of brick specified in Section 04 01 20.52.

B. Source Limitations: Obtain each type of material from a single source to provide consistent quality in appearance, physical properties, and ensure match of quality, color and texture.

C. Standards: Comply with BIA, MIW and NPS Standards, Technical Notes, and Guidelines.

D. Mock-Ups/Sample Panels: Prepare mock-ups of brick restoration to demonstrate aesthetic effects and quality standards for materials, fabrication, workmanship, and installation. Notify Owner and Architect 5 days prior to beginning mock-ups.
   1. Locations as directed by Architect.
   2. Mortar Repointing: Construct 10 square foot mock-up test sections for demonstration of repointing mortar profile; include removal of existing mortar in existing joints, preparation of the joints, installation of repointing mortar, and clean-up.
   3. Masonry Repair: Construct 10 sf mock-up in existing walls for helical ties, 5 lf mock-up for pins and anchors.
   4. Sealant Installation: 10 lf mock-up of new sealant in prepared existing masonry joints;
   5. Obtain Owner and Architect approval of mock-ups prior to proceeding with the work.
   6. Approved mock-ups may become part of the completed Work if undisturbed at the time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver packaged materials in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
   2. Store and handle materials in accordance with manufacturer’s instructions.

1.07 PROJECT SITE CONDITIONS

A. Environmental Requirements: Proceed with installation only when existing and forecasted weather conditions permit repointing work to be performed according to product manufacturers' written instructions and specified requirements.
   1. Consult BIA/MIW Guidelines for cold-weather and hot-weather limitations.
   2. Cover partially completed work when work is not in progress. Extend cover minimum 24 inches beyond each side of area to be protected, and securely hold in place.

B. Disposal of Waste: Keep material out of sewers, storm drains, surface waters and soil.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
   1. Special Project Warranty: 2-year installer's Labor and Materials warranty against defects in materials or workmanship for masonry restoration Work of this Section.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

2.02 RESTORATION SPECIALISTS

A. Historic Masonry Restoration Specialists: Pioneer Masonry Restoration Company, or approved.

2.03 REPAIR MATERIALS

A. Pins and Anchors:
   1. Use stainless steel pins and anchors.
   2. If epoxy is utilized, ensure that the portions of the pins and anchors that will be in contact with the epoxy are deformed to promote a mechanical bond.
   3. Set anchors in backing wall using socks, plates or other methods.
   4. Do not rely solely on the epoxy connection between the anchors and substrate.

B. Masonry Repair Anchors, Helical/Spiral Type: Remedial tie system for stabilizing masonry. Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it. Length and diameter as indicated and as required.
   1. Provide adhesive-installed anchors complete with manufacturer's standard epoxy adhesive and injection tubes, or other devices required for installation.
   2. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.
   3. Manufacturers/Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. BLOK-LOK Limited "Spira-Lok".
      b. Halfen "Helifix".
      c. Heckmann Building Products Inc., "#391 Remedial Tie".
      d. Hohmann & Barnard, Inc. "Helix Spiro-Ties".
      e. Simpson Strong Tie "Heli-Tie".
   4. Anchor Accessories: CTP "Façade Tie Bracket"

2.04 REPOINTING MORTAR

A. Mortar Mix - General:
   1. Proportion Method mixes as indicated, to match existing appearance and color, based on mock-up samples. Provide up to three mock-up samples for approval.
   2. ASTM C270 (proportion method), and ASTM C1713.
   3. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
   4. Do not use admixtures in mortar unless otherwise indicated.

B. Historic Mortar Mix: Factory pre-blended, Proportion Method mortar mix, complying with AMR Labs Report.
   1. Mortar Type: Type N.
   2. Proportions: 1 part gray Portland cement to 1.25 parts hydrated lime to 6 parts mortar sand (by volume).
   3. Color to match existing, black, white, and gray sand.

C. Water: Potable.

2.05 AUXILIARY MATERIALS AND ACCESSORIES

A. Mortar Cleaning: Products as specified in Section 04 01 20.52, Masonry Cleaning.

B. Water-Repellent Coatings: See Section 07 19 00, Water Repellents and Graffiti-Resistant Coatings.

C. Metal Flashings: As specified in Section 07 62 00, Sheet Metal Flashing and Trim.

D. Sealant Joints: Silicone sealant as specified in Section 07 92 00, Joint Sealants.

E. Miscellaneous Accessories: As required for the work.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protection: Keep wall area below repair work protected from this work. Cover sills, ledges, and other projecting items to protect them from this work.

B. Remove downspouts and associated hardware adjacent to brick during masonry repair. Reinstall when repairs are complete.
   1. Provide temporary rain drainage during work, in enclosed scaffolding, to direct water away from building.

3.02 MASONRY RESTORATION - GENERAL

A. Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.

B. Remove abandoned anchors, brackets, wood nailers, and other extraneous items no longer in use unless indicated to remain. Patch hole where each item was removed.
   1. Remove items carefully to avoid spalling or cracking masonry.
   2. Notify Architect before proceeding if an item cannot be removed without damaging surrounding masonry.

3.03 REPAIR MATERIALS

A. Pins and Anchors: Install in compliance with manufacturer's written installation instructions.

B. Helical Wall Tie Anchoring Systems: Install in compliance with manufacturer's written installation instructions.
   1. Drill a poilot hole through the façade material to the concrete to the specified embedment depth plus 1 inch. Use drill in rotation -only mode when drilling into soft masonry.
   2. Position the tie fastener into the installation tool and insert into the pilot hole.
   3. Drive the tie until the tip of the installation tool enters the exterior surface of the masonry and countersinks the tie below the surface. Patch the hole with mortar.

3.04 MORTAR REPOINTING

A. Mortar Removal and Repointing:
   1. Where repointing mortar is indicated to be installed, remove the existing mortar to a depth 2.5 times the width of the joint. Remove existing mortar within the raked out joints to provide reveals with square backs and to expose masonry surfaces for contact with the repointing mortar.
   2. Joint Preparation:
      a. Dampen the brick so that it is moist, not wet at the surface, in order to promote a good mortar bond.
      b. Scarify brick surfaces within joint with stiff wire brush to promote bond with mortar.
      c. Brush or vacuum the joints to remove dirt and loose material.
         1) Contractor may lightly spray (low pressure water wash) water into the joint to remove any remaining dust and debris taking care to not excessively wet the brick or cause water infiltration into the interior wall.
      d. Do not spall or chip the brick in the process of joint preparation.

B. Mortar Mixing: Add water to factory pre-blended mortar mix per manufacturer's instructions.
   1. Mix in a mortar mixer, bucket using a power drill and paddle or other similar method to ensure complete blending of the materials. Do not use a concrete mixer to mix mortar.
   2. The water content may be adjusted on-site by the Owner and Architect.
      a. Contractor may request adjustment based upon the performance of the mix during pointing.
      b. Note: Installing an overly wet lime mortar will result in shrinkage cracks.
   3. Mortar shall not be re-tempered after initial mixing.
   4. Discard any unused mortar after 1 hour.

C. Repointing: Comply with Preservation Brief #2 and ASTM E2260. Match mock-ups approved by the Architect.
   1. Do not begin until the joint has been properly prepared, and is free of dust, debris and contaminates that may affect the adhesion of the mortar to the brick. Verify that the existing mortar is square to the joint.
   2. Pre-wet both replacement and surrounding bricks prior to repointing and begin work once the joint surface is in a damp (not wet) condition. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.
      a. Ensure that surfaces are a consistent level of dampness throughout the installation of mortar for the entire work, in order to promote consistent visual and tactile appearance of the mortar.
      b. Do not install mortar if excessively wet conditions are observed in the wall or if environmental conditions will result in the wall becoming excessively wet after shortly after mortar placement.
   3. Joints shall be pointed in a single lift and thoroughly compacted.
      a. Strike skyfacing joints first, then the head joints, followed by the bed joints.
      b. Force mortar into joints, taking care not to smear mortar on adjoining surfaces.
         1) Utilize a pointing tool that fits between brick to compact mortar in the joint.
         2) Clean masonry surfaces as repointing progresses by dry brushing or rubbing with dry burlap to remove smears before tooling joints.
   4. Tool the mortar joints when the mortar is "thumbprint hard" with a smooth jointing tool to produce the selected joint profile. Refer to Drawings for joint profiles.
      a. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
      b. When mortar is hard enough to support units, remove shims and other devices interfering with pointing of joints.
   5. Remove any excess mortar inadvertently deposited on the face of the brick before it dries.
      a. Do not use acid to clean off excess mortar.

D. Mortar Curing:
   1. Protect newly placed mortar from the elements for minimum 72 hours after placement.
      a. Protect any skyfacing joints for a minimum of one week.
   2. Do not expose the mortar to temperatures above 85 deg F or below 40 deg F during the curing cycle.
   3. Do not expose the mortar to driving rain or direct sunlight during or for a minimum of 72 hours after placement or for one week's time for any sky facing joints
   4. Lightly mist the mortar three times a day over the initial 72 hours after placement.
      a. Damp burlap bags may be placed over the wall during this time period should environmental conditions consist of hot weather/direct sunlight, but the bags must stand proud of the mortar.
   5. Ensure sufficient ventilation near the brick wall surface during initial curing process.
   6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.05 FIELD QUALITY CONTROL

A. Mock-Ups approved by the Owner shall be the basis of the aesthetic acceptance and technical quality of the work.
   1. Pointing: Cut out defective work and repoint with mortar. Remove excess mortar on masonry and adjacent surfaces.

B. Verify work of this Section in accordance with testing and inspection requirements of IBC. See also, Section 01 45 23, Testing and Inspection Services.
   1. Where necessary to facilitate the schedule, or confirm product performance, material samples shall be taken for laboratory analysis.
   2. Include preconstruction and construction testing of expansion joint sealants.

3.06 CLEANING

A. Clean adjacent non-masonry surfaces with detergent and soft brushes or cloths. Remove masking materials. Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Interior concrete masonry units (CMU) anchored to existing concrete wall.
2. Mortar, grout, reinforcement, ties, anchors, and accessories as required for a complete installation.

B. Related Sections:
1. Section 01 45 23 - Testing and Inspection Services
2. Section 07 92 00 - Joint Sealants: backer rod and sealants at joints

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ACI 315	Details and Detailing of Concrete Reinforcement
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASTM	Standards indicated herein
MIW	The Northwest Masonry Guide
NCMA	Publications and Recommendations
	TEK Manual for Concrete Masonry Design and Construction
PCA	Concrete Masonry Handbook
TMS 402	Building Code Requirements for Masonry Structures
TMS 602	Specifications for Masonry Structures
IBC	International Building Code with City of Mercer Island amendments

1.03 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each product specified.
2. Shop Drawings:
   a. Elevations showing unit coursing, sizes, anchor spacing and penetrations.
   b. Reinforcing Steel: Detail bending, laps, and placement per ACI 315.
3. Mix Designs: Include type, and proportion of ingredients, for mortar and grout.
4. Test Reports: Reports shall be prepared by a qualified independent laboratory.
   a. Field Tests and Field Reports.
5. Certifications: Manufacturer's certification that CMU units meet or exceed specified requirements.
6. Qualifications Data: For manufacturer and mason.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Shall have minimum of 10 years of experience manufacturing CMU of the type specified, that have never failed regardless of the length of service.

B. Mason/Installer Qualifications: Installer shall have been regularly engaged in masonry work of comparable magnitude to work of this project for not less than 5 years.

C. Source Limitations: Obtain each type of masonry unit from a single source manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver masonry on pallets under protective cover; verify undamaged condition at site.
   2. Do not stack pallets. Store pallets on level grade, on elevated platform in dry location. Cover tops and sides of stacks to protect from rain. If masonry units become wet, do not install until they are dry. Prevent breakage, soiling, and other damage at all times.
   3. Store reinforcing bars in manner required to remain free of rust, dirt and loose scale.
   4. Store other materials in original unopened and labeled containers in dry location.

1.06 PROJECT SITE CONDITIONS

A. Environmental Conditions:
   1. Ambient Temperature: Ensure that ambient temperatures are above 40 deg F and below 90 deg F prior to, during and/or after completion of masonry work.
   2. Cold and Hot Weather Limitations: Comply with requirements of TMS 602 or IBC, whichever is more stringent. Protect completed work from cold and frost until mortar has set. Do not add antifreeze ingredients.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with requirements of IBC.
   2. Special Testing and Inspections: Refer to IBC, Section 01 45 23, Testing and Inspection Services, and Structural General Notes.
      a. Notify Owner and Architect 48 hours prior to each grouting operation.

B. Performance:
   1. Thermal and Building Movement: Comply with NCMA TEK and NWCMA TEK Notes.

2.02 CONCRETE MASONRY UNITS (CMU)

A. CMU Units: Standard hollow block units, ASTM C90 and TMS 602/ACI 530.1/ASCE6, except as modified in Contract Documents.
   1. Unit Sizes: Refer to Drawings.
      a. Nominal Face Dimension: 8 inches high by 16 inches long.
      b. Nominal Depth: 4 inches.
      c. Manufacturing Tolerance (ASTM C90): +/- 1/8 inch from specified dimensions.
   2. Density/Classification: Grade N, Medium weight.
   3. Faces: Standard (smooth-faced).
   4. Aggregate Types: ASTM C33 normal weight aggregate.
   5. Color: Natural.

2.03 MORTAR AND GROUT

A. Mortar and Grout - General:
   1. Refer to Structural General Notes and Structural Drawings
   2. Do not use calcium chloride; do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
      a. Use Portland cement and lime mortar unless otherwise indicated.
   3. Materials:
      a. Portland Cement: ASTM C150, Type I or II.
      b. Hydrated Lime: ASTM C207, Type S.

c. Mortar Aggregate: ASTM C144.
d. Grout Aggregate: ASTM C404.
e. Water: Clean and potable.
f. Accelerating Admixture: ASTM C494, non-chloride type for use in cold weather.

B. Mortar for CMU: ASTM C270, Type S.

C. Grout for CMU: ASTM C476.
1. Use grout of type and compressive strength that will comply with TMS 602 for dimensions of grout spaces and heights.

D. Equipment (mixes): Use mechanical batch mixer and comply with referenced standards.

2.04 REINFORCEMENT

A. Reinforcement: Refer to Structural General Notes.
1. Uncoated Steel Reinforcing Bars, ASTM A615, Grade 60, fabricated per TMS 602/ACI 530.1/ASCE 6, for reinforcing bars in grouted cells.
2. Reinforcing Bar Positioners: 0.148 inch hot-dip galvanized steel wire to hold bars in center of cells. Units designed for number of bars indicated.

2.05 TIES AND ANCHORAGE

A. Manufacturers/Products:
1. Hohmann & Barnard, Inc.
2. Wire Bond.
3. Or approved.

B. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow horizontal or vertical adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.109 inch thick stainless steel sheet,
2. Tie Section: Triangular-shaped wire tie made from stainless steel wire.
3. Corrugated Metal Ties: Minimum 7/8 inch wide, 0.109 inch thick stainless steel sheet, with dovetail tabs for inserting into dovetail slots in concrete.
4. Material: ASTM A580 Type 304 stainless steel.

2.06 ACCESSORIES

A. Joint Materials:
1. Compressible Filler: ASTM D1056, Grade 2A1, premolded filler strips.
2. Control Joints: Continuous, premolded rubber, cross-shaped to form a shear key/maintain lateral stability, Hohmann & Barnard “RS Series”, or approved.
3. Backer-Rod: Continuous closed-cell polyethylene foam backer-rod, compressed 4 to 40 percent inside cavity. Sealants as specified in Section 07 92 00 Joint Sealants.
4. Bond-Breaker Strips and Miscellaneous Accessories: ASTM D226, or as required.

B. Miscellaneous Steel Fabrications: Dowels, angles, plates, and the like, as indicated on Structural Drawings, and as required for complete installations.

C. Masonry Cleaners: Non-acidic, commercial cleaner designed for removing mortar/grout stains from new masonry without damaging the masonry. Muratic acid not allowed.
1. Manufacturers/Products as recommended by cleaner manufacturer and approved by CMU manufacturer.

D. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane.

E. Joint Sealants: Sanded silicone sealant and backer rod, with sealant matching mortar color at exposed locations; as specified in Section 07 92 00, Joint Sealants.

F. Provide isolation washers and the like to prevent corrosion of dissimilar metals.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Inspect units prior to installation. Reject/do not install chipped or cracked units.
2. Field verify locations and dimensions of penetrations; verify that reinforcing is properly placed; and that foundations are level within a tolerance of +/- 1/2 inch.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Clean substrates by removing mud, oil, or other materials that will adversely affect bond to mortar or grout.
1. Reinforcement with rust and/or mill scale is acceptable provided attributes of a cleaned sample are in accordance with the applicable ASTM specification.

B. Protection and Stain Prevention:
1. Protect base of walls from mortar splatter. 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 surfaces.
2. Protect other surrounding surfaces to preclude damage.

3.03 INSTALLATION

A. Installation – General:
1. Install Work in accordance with IBC, and provision of the Contract Documents.
2. Use full-size units without cutting if possible. Half masonry unit permitted at control joints and corners. Prevent broken masonry unit corners or edges.
3. If cutting is required 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 with cut edges concealed.
4. Coordinate placement of reinforcement, anchors, and metal fabrications.
5. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

B. Laying Masonry Walls:
1. Lay out walls in advance for accurate spacing of joint patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets Do not use less than half-size units. Select and arrange units for exposed masonry to produce a uniform blend of colors and textures.
2. Establish lines, levels, coursing, and patterns indicated.
a. Bond: Running bond.
b. Coursing: One unit and one mortar joint to equal 8 inches.
3. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

4. Install compressible filler in joint between top of wall and underside of structure above.
5. Lay straight, plumb, level courses. Break vertical joints to true, evenly spaced lines.
6. Install units with square (90 degree) corners.
7. Provide cleanouts at bottom course of each grout lift. Clean grout space prior to grouting; seal cleanouts after inspection and before grouting.

C. Mortar Bedding and Jointing:
   1. Lay hollow units as follows:
      a. Bed face shells in mortar and make head joints of depth equal to bed joints.
      b. Bed webs in mortar in all courses of piers, columns, and pilasters.
      c. Bed webs in mortar in grouted masonry, including starting course on footings.
      d. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
   2. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
   3. Prevent grout or mortar or soil from staining the face of masonry to be left exposed. Remove excess mortar and mortar smears as work progresses.

D. Masonry Joint Reinforcement: Refer to Structural Drawings.
   1. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere.
   2. Space joint reinforcement as indicated on Structural Drawings, but not more than 16 inches on center
   3. Lap joint reinforcement ends minimum six (6) inches.

E. Anchoring Masonry to Concrete (single wythe): Refer to Structural Drawings.
   1. Fasten anchors to concrete and embed in masonry joints as masonry is laid.
   2. Provide an open space not less than 1/2 inch wide between masonry and concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
   3. Anchor masonry with anchors embedded in masonry joints and attached to structure.
   4. Space anchors [as indicated on Structural Drawings] [at maximum of 24 inches vertically and 36 inches horizontally].

F. Reinforced Unit Masonry: Refer to Structural Drawings.
   1. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   2. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
   3. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
      a. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space, and maximum pour height.
   4. Place and consolidate grout fill without displacing reinforcing. Maintain position within 1/2 inch of approved dimensioned position.
   5. Limit height of vertical grout pours to 60 inches, unless high-lift grouting is allowed.

G. Control Joints: Install as masonry progresses to accommodate movement in masonry walls.

H. Construction Tolerances:
   1. Maximum Variation from Location in Plan: Plus or minus 1/2 inch.
   2. Maximum Variation in Dimensions in Elevation: Plus or minus 1/4 inch.
   3. Maximum Variation from Plumb - Vertical Lines and Surfaces: 1/4 inch in 10 feet.
   4. Maximum Variation from Level Coursing: 1/4 inch in 10 feet, or 1/2 inch maximum.
   5. Maximum Variation from Unit Face to Adjacent Unit Face: 1/16 inch.
   6. Maximum Variation in Mortar Joint Thickness: Plus or minus 3/8 inch.

3.04 FIELD QUALITY CONTROL

A. Contractor shall:
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout

B. Owner will engage a qualified independent testing agency as specified in Section 01 45 23, Testing and Inspection Services, to perform field quality-control tests and inspections in accordance with TMS 402/ACI 530/ASCE5, and to prepare reports.
   1. Level B (non-essential facility):
      a. Verify proportions of site-prepared mortar.
      b. Verify compliance of grout spaces and of grades, sizes, and locations of reinforcement.
      c. Verify proportions of site-prepared grout.
   2. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
   3. Grout Tests, and Concrete Masonry Unit Test (ASTM C140 for compressive strength).

C. Retesting of materials failing to meet specified requirements shall be by Contractor, at no cost to the Owner.

3.05 REPAIRING 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. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution. Use non-metallic tools in cleaning operations.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry surfaces to remove excess mortar, mortar droppings, splatter, stains, and other foreign matter as recommended by NCMA TEK-8-4A.
   1. Leave surfaces clean, free from mortar and other stains.

E. Masonry Waste Disposal:
   1. Recycling: Return broken CMUs to manufacturer for recycling.
   2. Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, legally dispose of, off Owner’s property.

END OF SECTION

DIVISION 05
METALS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Restoration of existing steel ledgers at Boiler Building windows.
a. Cleaning.
b. Removing dirt, soil, or discoloration, stain, and corrosion.
2. Substrate preparation and finish coatings specified in Section 09 96 00.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 01 43 39 - Mock-Up Requirements
4. Section 09 96 00 - High Performance Coatings

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
NPS Standards	The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings
•	Preservation Tech Notes No.2: Restoring Metal Roof Cornices
SMACNA	Architectural Sheet Metal Manual
IBC	International Building Code with City of Mercer Island amendments

1.03 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each type of product indicated. Include recommendations for installation, application and use.
2. Shop Drawings: Plans, elevations and details documenting original components and existing conditions, to be dismantled, and restored for reinstallation. Photograph conditions as specified in Section 01 32 33, Photographic Documentation.
3. Samples for Verification: Coordinate with mock-ups. See 1.05 G. below.

1.04 QUALITY ASSURANCE

A. Source Limitations: Perform metal restoration by or under supervision of single fabricator/installer.

B. Comply with NPS Standards, Preservation Briefs and Tech Notes.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Deliver materials to Project site in manufacturers' original and unopened containers, labeled with description of contents and names of manufacturers.
2. Comply with manufacturer's written instructions for environmental limitations including minimum and maximum temperature for storage of materials.

1.06 PROJECT SITE CONDITIONS

A. Weather Limitations: Comply with environmental limits set by each manufacturer's written instructions and specified requirements for environmental limitations.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

2.02 CLEANING MATERIALS

A. Water: Potable.

B. Metal Cleaning Methods and Materials - General: Materials and methods/process as accepted by Owner and Architect during mock-up.

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of hot water for every 5 gal. of solution required.

D. Chemical Cleaner: Copper sulfate and nitric acid.

E. Nonacidic Liquid Chemical Cleaner: Manufacturer's standard mildly alkaline liquid cleaner, formulated for removing organic soiling from ordinary building materials.
1. Abrasive agents not accepted.

F. Other cleaning materials and methods accepted by Owner and Architect.

G. Equipment: Cellulose sponge mop, clean soft wiping cloths, and as recommended by product manufacturers.

2.03 FINISHES

A. Field-Applied Protective Coatings: Substrate preparation, primer, and finish coatings, as specified in Section 09 96 00, High Performance Coatings.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ensure that surfaces to receive cleaning and restoration are clean, even, smooth, dry and free from defects and projections which might adversely affect the work.

B. Protection: Protect persons, vehicles, building, site, plants, and surrounding surfaces from harm resulting from historic cleaning and restoration treatments.
1. Erect temporary protective covers/barriers during course of historic restoration work.

C. Provide protection as required to prevent cleaning and restoration materials and runoff from entering Lake Washington.

3.02 CLEANING AND METAL RESTORATION PROCEDURES, GENERAL

A. Conform to referenced NPS Standards and provisions of the Contract Documents.

B. Historic Treatment - General: Historic treatments for metal shall be performed by specialist firm approved by Owner and Architect. Ensure that historic treatment specialist's field supervisors are present when metal restoration work begins and during its progress. In treating historic items, disturb them as minimally as possible and as follows.
   1. Stabilize metal to stop progress of deterioration and corrosion, and reestablish structural integrity and weather resistance while maintaining the existing form.
   2. Repair items where stabilization is not sufficient to stop progress of deterioration.
   3. Repair items in place and retain as much original material as possible.
   4. Replace or reproduce historic items where indicated or scheduled.
   5. Patching, repairs, replacements, and additions to existing materials shall be reversible whenever possible.
   6. Comply with product manufacturer's written instructions.

C. Cleaning - General:
   1. Use only those cleaning methods indicated for each type of metal, applied in conformance with manufacturer's instructions, and accepted by Architect during mock-up process.
   2. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces including corners, moldings, and interstices, and that produces an even effect without streaking or damaging ornamental metal surfaces.
   3. Neutralize chemical residue where applicable, and rinse by working upward from bottom to top of each treated area at each stage or scaffold setting.

D. Corrosion: Remove and stabilize existing deteriorating corrosion. Use only materials and methods accepted by Architect during mock-ups.

E. Repair Metal Items: Match existing materials and features and repair existing work in place.
   1. Where indicated or accepted, repair metal by limited replacement in kind.

3.03 PREPARATION FOR CHEMICAL CLEANING

A. General: Comply with chemical cleaner manufacturer's written instructions for protecting building surfaces against damage from exposure to their products.

B. Protection:
   1. Prevent chemical cleaning solutions from coming into contact with pedestrians, vehicles, landscaping, buildings, and surfaces that could be injured by such contact.
   2. Do not clean metal during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
   3. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
   4. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion and damage and / or contamination of surface waters.
      a. Provide protection as required to prevent chemical cleaning materials and runoff from entering Lake Washington.
   5. Erect temporary protective covers/barriers during course of historic restoration work.

C. Protect adjacent surfaces from contact with chemical cleaners by covering them with a liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces.

3.04 CLEANING AND PROTECTION

A. Clean metal according to metal cleaner manufacturer’s written instructions in a manner that leaves an undamaged and uniform finish matching approved mock-up sample.

B. Protect finishes of metal from damage during construction period with temporary protective coverings approved by metal fabricator. Remove protective covering when requested.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Welding materials and methods of joining miscellaneous and structural metals.

B. Related Sections:
1. Section 01 45 23 - Testing and Inspection Services
2. Section 03 30 00 - Cast-In-Place Concrete: reinforcing
3. Section 05 12 00 - Structural Steel
4. Section 05 31 00 - Steel Decking
5. Section 05 50 00 - Metal Fabrications
6. Section 05 73 16 - Wire Rope Decorative Railings
7. Section 07 62 00 - Sheet Metal Flashing and Trim

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

AISC	Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, American Institute of Steel Construction, latest Edition.
AWS A Series	American Welding Society (AWS) Standards and Welding Procedure Specifications (WPSs)
AWS D Series	Structural Welding Codes for each material AWS D1.1- Structural Welding Code AWS D1.4 - Reinforcing Steel Welding Code AWS D1.8 - Structural Welding Code Seismic Supplement
IBC	International Building Code, with City of Mercer Island amendments

1.03 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Shop Drawings: Indicate welded connections on Shop Drawings in technical sections using standard AWS symbols. Show each welded connection with details indicating size, length, location, type of weld, and whether shop-welded or field-welded.
2. Manufacturer's Certification: Filler material for welding.
3. Testing and Inspection results.
4. Welding Procedure Specification for Lateral Force-Resisting System connections.
5. Welding Procedures and Qualifications:
   a. Structural Steel: For welded joints prequalified and non-prequalified by AWS D1.1, submit a description of welding procedures proposed for use on structural steel. Furnish joint welding procedure qualification tests as required by AWS D1.1 for non-prequalified welded joints.
   b. Reinforcing: Description of reinforcement weld locations, welding procedures, and welder qualifications when welding is permitted.
   c. Other procedures as required by Contract Documents.
   d. Welding Procedures shall be reviewed by the Owner’s Testing Agency. Submit copy of the approved procedures to the Architect.

1.04 QUALITY ASSURANCE

A. Welder Qualifications/Certification:
   1. Each welder performing work on this project shall be qualified before commencement of welding on this project, in accordance with AWS and Washington Association of Building Officials (WABO).
   2. Welding shall be performed by “Certified Welders”,certified within previous 12 months.
   3. Welders shall be pre-qualified for each position and weld type which the welder will be performing.
   4. Welding Certifications: Copies of each welder’s certification records shall be made available to the Architect and Owner’s Testing Agency for review.
   5. If re-qualification/certification is required, the cost of these tests shall be borne by the Contractor.

B. Comply with requirements in referenced AWS welding codes.

C. Lateral Force-Resisting System: Weld in accordance with AWS D1.8.
   1. Submit for approval prior to fabrication: Written welding procedure specification for shop and field welding of all Lateral Force-Resisting System connections.

D. Ultrasonic Testing: Ultrasonic test methods shall conform to AWS D1.1.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.
   1. Refer to Structural General Notes and individual technical sections.

B. Test and Inspections: This Work is subject to special testing and inspection. Refer to Section 01 45 23, Testing and Inspection Services, and Structural General Notes.
   1. A qualified inspector under the requirements of the building code shall continuously inspect field welds.
      a. All welds shall be checked by visual means and by other methods deemed necessary by the welding inspector.
      b. All full penetration field and shop welds shall be 100 percent full time inspected and tested by ultrasonic, non-destructive procedures.
   2. Minimum 48-hour notice shall be given for joints requiring inspection for proper end preparation, root opening, and the like, prior to welding.
   3. Submit results for tests to Owner and Architect (informational submittal).

2.02 GENERAL

A. Refer to Structural General Notes.

B. See individual technical Specification Sections for metals to be welded.

C. Electrodes: Comply with AWS requirements.
   1. Steel: In accordance with General Notes on Structural Drawings and as required to develop strength of particular grade and section welded in accordance with AWS D1.1 and D1.8 requirements. Use E70XX electrodes.
      a. See Structural General Notes for weld filler metal including Charpy V-notch impact toughness requirements.
   2. Aluminum: Inert gas with tungsten electrodes.
   3. Others as indicated in Contract Documents.

PART 3 - EXECUTION

3.01 GENERAL

A. Structural Steel Framing:
   1. Welding processes other than shielded metal arc, flux core arc, and submerged arc may be used, provided procedure qualification tests in accordance with the AWS are made for the intended application of such processes.
   2. Types of Welds: Required weld types are indicated by symbols on Drawings; characteristics of welds shall be in accordance with standard specifications or codes as applicable; each welder shall mark his identification symbol on his work.
   3. Preparation of Steel Surfaces to be Welded: Prepare edges to be joined by welding as indicated on Drawings and in accordance with AWS. Welds shall be made to clean base material. Steel: Remove coatings, galvanizing, grease, scale, rust, and other foreign matter at locations that are to be welded in accordance with AWS D1.1.
   4. Consider the toughness and notch sensitivity of the steel in the formation of welding procedures to prevent brittle and premature fracture during fabrication and erection.
   5. Detailing of connections, welding sequences, and preheat methods shall be such as to minimize restraint and the accumulation and concentration of through thickness strains due to weld shrinkage.
   6. At welded joints that are not hidden by architectural finish materials, remove projecting ends of runoff tabs, backer bars, and any other erection aids, and grind flush with edges of plates. Weld "dams" and "end dams" shall not be used.

B. Reinforcing Steel: Welding or tack welding of reinforcing bars to other bars or plates, angles, and similar shapes is prohibited, except where specifically shown on plans or accepted by Architect; where required, use electrodes in accordance with requirements of ANSI/AWS D1.4 and the Structural General Notes.
   1. Make no welds within six bar diameters of a "cold bend".

C. Studs and Anchors: Comply with AWS. Do not weld when base metal material temperature is below 0 deg F.

D. Non-Fusible Backing Materials: The use of non-fusible backing materials, including ceramic and copper, in accordance with the structural notes, is permitted only with satisfactory welder qualification testing performed using the type of backing proposed for use, using the test plate shown in AWS D1.1, Figure 4.21, except that groove dimensions shall be as provided in the weld procedure specification. Welders using these backings shall be prequalified per AWS.

3.02 PREPARATION

A. Welding: Shape edges shall be joined as indicated on Drawings; prepare and clean edges of oil, grease, scale, and rust in accordance with AWS D1.1.

B. Miscellaneous and Reinforcing Steel: See Drawings for welding of reinforcing bars or plates, angles, and similar shapes. Conform to referenced AWS D1.1 or D1.4.

C. Protection:
   1. Take the precautions required by regulations, standards, and Specifications to protect personnel and property.
   2. Carefully mask or shield adjacent surfaces to prevent damage from heat or welding materials.
   3. Take particular care to prevent fires.
   4. When welding finished assemblies adjacent to or above finished materials, protect surfaces from damage due to welding.

3.03 WELDING PROCEDURES

A. Clean and weld in accordance with referenced AWS D1.1, D1.2, D1.3, D1.4, D1.6 and D1.8.
   1. Electrodes shall be thoroughly dry prior to use.

B. Grind smooth welds exposed to view. Remove service metal and piece marks on steel items exposed to view.

C. Cleaning:
   1. Remove slag or flux remaining on any bead.
   2. Remove any cracks or blowholes appearing on any bead. Use methods such as chipping, grinding, or gas gouging.
   3. Touch up cold galvanizing over galvanized steel at field welds.

D. After inspection, protect weld from rust with protective primer, applicable to substrate and compatible with final finish. Refer to requirements indicated in technical sections.

3.04 REPAIR

A. Repair damaged finishes as directed, or replace damaged items at no added cost to Owner.

B. Repair welds found defective and reinspect by same methods originally required.
   1. Welds found to be defective shall be repaired and reinspected by the same methods originally used, at no added cost to the Owner.

3.05 FIELD QUALITY CONTROL

A. Verify work of this Section in accordance with Section 01 45 23, Testing and Inspection Services.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Fabrication and erection of structural columns and beams supporting steel deck at mezzanine, wide flange steel headers, and other structural members as indicated.
2. Required connections, welds, washers, bolts, nuts, shims, templates, base plates, loose bearing plates, joint preparation, and embedded items related to structural steel.
3. Erection aides, including installation and removal of temporary erection bracing.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures: existing structure
2. Section 01 45 23 - Testing and Inspection Services
3. Section 03 30 00 - Cast-In-Place Concrete
4. Section 05 05 99 - Welding
5. Section 05 31 00 - Metal Decking
6. Section 05 50 00 - Metal Fabrications
7. Section 05 51 00 - Metal Stairs: stair stringers, ledgers and tread angles
8. Section 09 91 00 - Painting: interior exposed steel
9. Section 09 96 00 - High Performance Coatings: coatings for new columns and headers at bathroom doors

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

AISC	•	Manual of Steel Construction
	•	Code of Standard Practice for Steel Buildings and Bridges, amended as indicated on Structural General Notes
	•	Specification for Structural Steel Buildings
	•	Seismic Provisions for Structural Steel Buildings
	•	Specification for Structural Joints Using ASTM A325/A490 Bolts
ASTM		Standards indicated herein
AWS		Welding Standards AWS D1.1 Structural Welding Code – Steel
NAAMM-AMP 555		Code of Standard Practice for the Architectural Metal Industry
SSPC		Volume 2, System and Specifications
IBC		International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene before installation work of this Section begins, to review welding procedures, inspection requirements for critical welds, and other requirements.

B. Sequencing and Scheduling: Deliver devices to be embedded in cast-in-place concrete to the site in time to be installed before the start of cast-in-place concrete operations.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:

1. Product Data: Provide product data for each type of product. For shop primers, expansion anchors and adhesive anchors, include manufacturer's specifications and installation instructions.
2. Shop Drawings: Submit prior to any fabrication the following:
   a. Show steel layout, dimensions, welds, bolts, fasteners, anchorage, adjacent construction, and fabrication or erection accessories.
   b. Indicate size, type, grade, spacing and location of members.
   c. Indicate cambers.
   d. Indicate welded connections with details showing type, size, net weld lengths, locations and designation of electrodes, using AWS A2.4 symbols.
   e. Specify field welds, cuts, holes, and fasteners.
   f. Indicate surface preparation, finishes and shop primer.
3. Templates and Placement Plans: As required for satisfactory placing, connection, and anchorages.
4. Welding Procedures: Prequalified and non-prequalified welded joints per AWS D1.1.
5. Erection Plan (Informational Submittal): Include sequencing, temporary shoring and bracing, safety procedures, and the like. The erection plan will not be reviewed.
6. Inspection Test Reports: Copies of Contractor's ultrasonic testing reports if requested.
7. Verification Survey: Submit survey indicating conformance with specified tolerances. Indicate deviations from specified tolerances including deviations from specified field measured cambers. Structural engineer will approve or indicate required temporary shoring to compensate for out of tolerance cambers.
8. Manufacturer’s Certifications:
   a. Certification letter attesting that completed work is in accordance with the Contract Documents.
   b. Certification letter attesting that specified Shop Finish procedures, methods, and products including filler material for welding have been followed.
   c. Mill Test Reports: Certification numbers for test reports and numbers on product containers for nuts, bolts and washers conforming to ASTM A325, Type 1, or ASTM A490 must match. Provide test reports to purchaser and testing agency.
9. Qualifications Data: For fabricator/detailer/installer.

1.05 QUALITY ASSURANCE

A. Fabricator/Detailer/Installer Qualifications:
   1. Steel Fabricators: Shall have AISC "BU" certification at the time of bid, and maintain this certification for the duration of the Project.
      a. Non-AISC certified steel fabricators shall have a minimum of 5 years of experience on similar projects of equal or larger complexity and scope. Submit qualifications for review as indicated on Structural General Notes.
      b. Inspection of shop welds required by third party inspector of the Owner.
   2. Steel Erectors: Shall have AISC "CSE" certification.
      a. Non-AISC certified steel erectors shall have a minimum of 5 years of experience on similar projects of equal or larger complexity and scope. Submit qualifications for review as indicated on Structural General Notes.
   3. Steel Detailer: Shall have a minimum of 5 years of experience from projects similar in scope, magnitude and required quality. Submit names and experience for review as indicated on Structural General Notes.
   4. Welding shall be performed by current AWS Certified Welders. See Section 05 05 99, Welding, and Structural General Notes.

B. Connection Identification: Each person installing connections shall be assigned an identifying symbol or mark, and shop and field connections shall be so identified so that the Testing Agency can refer to the person making the connection.

C. Design of Connections:

1. Provide connections as shown or noted on the Drawings. Submit Request for Information (RFI) for the design of connections not shown or noted. Standard framing connections not shown shall be bid on the basis of AISC Manual Part 7 - Bolted Connections, or Part 8 - Welded Connections.
2. If Contractor wishes to use connection designs other than those indicated on the Drawings, they shall submit a written request prior to preparation of Shop Drawings, describing the proposed alternative designs for review by the Structural Engineer. Alternative connection designs may be used only if approved in writing by Architect and Structural Engineer. If approved, Contractor shall submit complete structural calculations for these alternative connection designs, sealed by a professional Engineer registered in State of Washington. Documentation of alternate connection may include submission of permit revision to AHJ. Fabrication of such alternative connections shall not proceed until these calculations have been submitted and approved.

D. Structural steel work shall conform to following:
1. Building codes, ordinances and the like.
2. AISC Code of Standard Practice for Steel Buildings and Bridges.
3. Technical specifications.
4. Steel that, in the opinion of the Owner's Testing Agency, is badly corroded or physically damaged shall not be incorporated in the work until the Owner, Architect, Contractor, Erector, and Fabricator have agreed to allow the installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Delivery: Protectively wrap and package.
2. Storage: Store metal above ground on platforms or skids; above snow, water or mud. Locate items to permit easy access for inspection and identification. Do not store on structure in a manner causing distortion or damage to structure.
3. Protect from moisture and corrosion until erected.
4. Include templates and instructions for proper setting of anchor bolts.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Conform to IBC Chapter 22.
2. Special Inspections and Testing: Comply with IBC Chapter 17.

B. Special Inspection and Testing: Work is subject to special inspection and testing by a qualified inspector under the requirements of IBC. Fabricator/Erector shall provide Testing Agency and Architect access to places where material is being fabricated /erected. See Section 01 45 23, Testing and Inspection Services, and Structural General Notes.

2.02 MATERIALS

A. Materials - General: Provide steel shapes, plates, angles, rods, and bars of structural quality, sizes and types as indicated on Drawings.

B. Steel:
1. Wide Flange Sections: ASTM A992, fy=50 ksi.
2. Other Shapes and Plates: ASTM A36, fy=36 ksi,.typical unless indicated otherwise; ASTM A572 , fy=50 ksi where indicated.
3. HSS Tubing: (not pipe): ASTM A500, Grade B, or ASTM A1085.

a. Rectangular and Square Sections: fy=46 ksi.
b. Round Sections: fy=42 ksi.

4. Structural Steel Pipe (not HSS): Seamless steel pipe conforming to ASTM A53, Grade B, Type E or S, fy=35 ksi.

2.03 AUXILIARY MATERIALS AND ACCESSORIES

A. Fastening Devices - General:
1. Refer to Structural General Notes and Structural Drawings.
2. Install in accordance with manufacturer's recommendations.
3. Types and sizes as detailed or required by conditions of installation.

B. Connection Bolts: See Structural General Notes.

C. Anchors Embedded in Concrete: ASTM A307 headed bolts, or ASTM A36 threaded rod with ASTM A563 heavy hex nut tack welded on the embedded end.

D. Grout: See Structural General Notes.

E. Electrodes: Comply with requirements of AWS D1.1; see also, Section 05 05 99, Welding.

F. Other Materials: Provide incidental and accessory materials, tools, methods, and equipment not specifically described but required for a complete and proper installation.
1. Comply with referenced Quality Assurance requirements as above.

2.04 FABRICATION

A. Fabricate steel in accordance with requirements of AISC specifications, and in accordance with provisions of the Contract Documents and details indicated on the Drawings.
1. Identify steel at mill showing ASTM standard grade and yield point.

B. Materials shall be properly identified with an erection mark corresponding to identifications on erection drawings and match-marked where field assembly requires. The sequence of shipments shall be such as to expedite erection and minimize the field handling of material.

C. Straightened Material: Examine straightened material prior to fabrication for signs of distress or other defects. No distressed or otherwise defective material accepted.

D. Milled Surfaces: Milled surfaces shall be completely assembled or welded before milling. Milled surfaces shall provide full contact bearing for the entire cross section.

E. Cutting: Holes and openings must be approved by the Architect.
1. Do no flame cutting by hand of openings greater than 1/2 the depth of the member, unless approved by the Architect.
2. Flame-cut holes shall be smoothed by chipping, planing, or grinding members to required AISC tolerances.
3. Sharp bends or kinks will not be allowed.
4. Flame cutting by hand will not be allowed for holes at connections.

F. Camber: Beams shall be upward cambered where indicated on the Drawings, and in conformance with requirements of AISC.

G. Connection: Punch and drill steel for attachment of other materials shown or specified to be attached permanently to structural steel. Provide required connection angles, plates, and brackets. Attach as shown on Drawings. Weld or bolt shop connections as indicated.

1. Bolted Construction: Fit bolted parts together tightly. Remove loose scale, burrs, dirt or other foreign material preventing solid seating of parts.

H. Base and Bearing Plates: Drill and fabricate to accurate sizes as drawn. Include fasteners and accessories required for installation.
   1. Manufacturer of bearing material to perform bonding.
   2. Protect bearing surfaces from damage. Bearing pads with scratches, or other marks, will be rejected.

I. Combination of bolts and welds shall not be used for stress transmission in the same faying face of any connection without prior approval by the Architect.

J. Welding: Refer to Section 05 05 99, Welding.

K. Built-up sections assembled by welding shall be free of warpage, and faces shall have true alignment.

L. Where structural steel is exposed to view, fabricate in accordance with AISC with SSPC SP6 surface preparation.

M. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations.

N. Fabrication Tolerances: Unless otherwise noted, fabricate structural members to referenced AISC Specifications for allowable tolerances.
   1. Straightness: Structural members of a single rolled shape or built-up structural member shall be straight within the tolerances allowed by wide flanged shapes in accordance with referenced ASTM A6.

O. Metal Decking: Refer to Section 05 31 00, Metal Decking, and Drawings.

2.05 SHOP-APPLIED FINISHES

A. Surface Preparation: Comply with SSPC standards for metal and conditions of installation.
   1. Exposed Steel: Minimum SSPC SP-6, Commercial Blast Cleaning, unless otherwise required by finish indicated.

B. Shop-Applied Primed Finishes:
   1. Shop prime steel surfaces indicated to receive finish coating.
      a. Conform to State of Washington Volatile Organic Compounds (VOC) Rules and Regulations (Chapter 173-490 WAC) for shop applied, non-toxic metal primer.
   2. Do not apply primer to:
      a. Surfaces to be field welded and surfaces encased in concrete or mortar.
      b. Contact surfaces at high-strength bolts.

C. Finish Schedule:
   1. Interior Steel to Receive Coating: Surface preparation, and field-applied primer and finish coatings, as specified in Section 09 91 00, Painting.
   2. Exterior Steel to Receive High-Performance Coatings:
      a. Shop-Applied Primer: Immediately after surface preparation, apply primer specified in Section 09 96 00, High-Performance Coatings.
      b. Field-Applied Finish Coats: As specified in Section 09 96 00.

PART 3 - EXECUTION

3.01 PREPARATION

A. Take Field Dimensions: Verify accuracy and suitability for installation/erection.

B. Temporary Bracing: Provide temporary bracing and guylines as required. Protect persons and property. Ensure proper alignment.

3.02 ERECTION

A. Conform with IBC and AISC Specifications, and in accordance with provisions of the Contract Documents, including configurations and connections indicated on Drawings.

B. Include necessary or required devices for complete installations.

C. Allow for erection loads and shore and brace framing until permanent connections are made and members are securely anchored into structure.

D. Column Bases and Bearing Plates: Align column bases and bearing plates for beams and similar structural members with wedges and shims. Grout under base plates as indicated on Structural General Notes.

E. Field Assembly: Accurately assemble structural framing to lines and members of framing system prior to fastening.
1. Clean bearing surfaces. Clean surfaces in permanent contact prior to assembly.
2. Splice structural members only where indicated or accepted. Fasten splices of compression members after bringing abutting surfaces completely into contact.
3. Make field connections by welding unless otherwise noted.
4. Tighten and leave erection bolts in place after welding.
5. Comply with AISC specifications for bearing, adequacy of temporary connections and the removal of paint of surfaces adjacent to field welds. Do not enlarge misaligned or mislocated holes in members by burning or the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
6. Holes, copes, or other cuts or modifications to the structural steel members shall not be made in the field without prior written approval of the Architect.
7. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing. Cutting will be permitted only on secondary members which are not under stress, as approved by Architect. Finish gas-cut sections equal to sheared appearance when permitted.
8. Erect structural steel, at floor levels, to plumb with maximum tolerances as indicated. Provide shims at perimeter edge of slab to secure brick ledger angles where required.

F. Take particular care in the erection of exposed steel members to ensure first class installations that are straight, parallel, in line with other members, or with sharp angles, and with sharp clean connections.

G. Installation/Erection Tolerances: Maximum deviations from plumb, level, and alignment are not to exceed referenced AISC specifications.
1. Top of Beams at Beam to Column Connections:
   a. Maximum Slope Between Columns: Maximum 1/8 inch in 10 foot.
   b. Cumulative Difference Between Columns: Maximum 1/4 inch.
2. Notify Architect that erection is substantially complete so that verification of tolerances can be accomplished. Errors in tolerances shall be corrected by the Contractor.

3.03 FIELD QUALITY CONTROL

A. Verify work of this Section in accordance with Specifications, Section 01 45 23, Testing and Inspection Services.

3.04 SURFACE REPAIR/TOUCH-UP AFTER INSTALLATION AND CLEANING

A. After erection, remove weld spatter, oil and grease. Clean abraded, bolted and welded areas in accordance with SSPC SP-3, Power Tool Cleaning.

B. For damaged ferrous metal surfaces, reapply specified shop primer. Work shall be free of scratches and stains.

C. Leave work and premises clean in accordance with SSPC SP-1, Solvent Cleaning, and free from residue of Work of this Section.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Steel composite floor deck, support framing and connections, including necessary and required accessories, and fastenings.
2. Finish: Galvanized steel.
3. Temporary shoring.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 01 45 23 - Testing and Inspection Services
4. Section 03 30 00 - Cast-In-Place Concrete
5. Section 05 05 99 - Welding
6. Section 05 12 00 - Structural Steel
7. Section 07 84 00 - Firestopping

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

AISI	North American Specifications for the Design of Light Gauge, Cold Formed Steel Structural Members
ASTM	Standards indicated herein
AWS	D1.1 Structural Welding Code – Structural Steel D1.3 Structural Welding Code – Sheet Steel
ICC-ES	Evaluation Reports
SDI	SDI Code of Recommended Standard Practices; Publication No. 31 - Design Manual for Composite Decks, Floor Decks, and Roof Decks
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate concrete and structural steel as required.

B. Pre-installation Meeting: Convene to review the structural documents prior to development of Shop Drawings. Include the Fabricator, Erector, and Testing Agency.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer's specifications, section properties, load tables, diaphragm shear tables, dimensions, finishes and installation instructions.
2. Shop Drawings/Erection Drawings:
a. Deck layout and orientation, profile/type and gauge, framing and supports, and unit dimensions and sections;
b. Size and location of holes and openings through deck;
c. Edge condition details and locations, including type and locations of all closures;
d. Additional deck support framing where required;

e. Types of welds and weld patterns, including weld washer requirements;
f. Types of connection fasteners and locations;
g. Layout of steel shear connector studs;
h. Shoring locations, if required;

3. Current ICC-ES Report confirming compliance of steel deck with specifications.
4. Certificates: For each type of steel deck, signed by product manufacturer.
5. Qualifications Data: For erector.

1.05 QUALITY ASSURANCE

A. Qualification of Erector/Installer: Shall have a minimum of 5 years of experience in the installation and/or erection of steel decking and accessories.
1. Each welder performing work on this project shall be qualified in accordance with AWS before commencement of welding on this project. Welds shall be performed by WABO certified welders. Provide copies of each welder's qualification records if requested. See also, Section 05 05 99, Welding.
2. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Deck material and connections shall have current ICC-ES Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Comply with requirements of SDI Manual.
2. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
3. 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

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC.
2. Special Inspections and Testing: Work of this Section is subject to testing and inspection required by IBC Chapter 17. See also, Section 01 45 23, Testing and Inspection Services, and Structural General Notes.

B. Performance Requirements / Design Criteria: Refer to Structural General Notes.
1. Metal decking shall comply with minimum properties indicated on Structural Drawings.
2. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's Specifications.
3. Live Load Deflections: As indicated

2.02 MANUFACTURERS

A. Manufacturers:
1. ASC Steel Deck
2. Epic Metals Corp.
3. Verco Decking Inc.
4. Or approved.

B. Products: Manufacturers, types, profiles, depths, and steel thicknesses as indicated on Structural General Notes and Drawings.

2.03 COMPOSITE FLOOR DECK

A. Products: Basis of Design: Verco, "W2 Formlok" Composite Deck.

B. Description: Comply with SDI-C.
1. Minimum Thickness/Types: 20 gauge.
2. Span Condition: As indicated on Drawings.
3. Depth and Profile: Furnish decking of depth and profile as indicated on the Structural General Notes and Drawings.
4. Deck capacities and connections shall be based on current ICC-ES Reports.
5. Finish: Galvanized.
   a. Where indicated to be left exposed and painted, shop prime underside of deck (white), and phosphatize the upper side but otherwise leave uncoated.

C. Furnish deck panels with butted end conditions and interlocking side laps, unless otherwise noted.

D. Furnish deck with UL approved tabs or clips for hanging loads:
1. Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.
2. Provide manufacturer's standard hanger attachment devices.

E. Furnish factory punch holes, of size and arrangement indicated, into each deck cell at preset inserts and header duct locations

2.04 MATERIALS

A. Steel: Cold-formed steel deck as indicated on Structural Drawings.
1. Composite Floor Deck: Steel sheets conforming to ASTM A653, Structural Steel (SS), Grade 50; hot-dip galvanized prior to being formed with ASTM A924 G60 zinc-coating.

B. Steel Bearing Plates, Angles and the Like: ASTM A36, unfinished.

2.05 RELATED MATERIALS

A. Support Framing: Provide additional support framing so that deck flutes are supported with bearing indicated. Where no details are provided or are not applicable, Contractor shall design and provide secondary structural steel framing consisting of ASTM A36 steel to support deck, complying with requirements of Section 05 12 00, Structural Steel.

B. Connections: Connections shall be as indicated on Structural Drawings and the following:
1. Welded Shear Connectors: ASTM A108, Grade 1015 or 1020; of dimensions complying with AISC specifications and the contract drawings; through deck stud welded shear connectors. Install in such a manner as to provide complete fusion between the end of the stud and structural steel base material.
2. Welding Materials: AWS D1.1 and D1.3 type required for materials being welded.
3. Weld Washers: Provide as required per manufacturer's recommendations.

C. Shear Connectors: Where deck capacity is determined based on shear studs, provide shear studs in addition to those indicated on the framing plans, and as recommended by the deck manufacturer to achieve required deck capacity. Ensure that additional studs placed on beam will not adversely affect shear value of studs required by the framing plan.

D. Reinforcing: Welded wire mesh, as indicated on Structural Drawings.

E. Accessories:
1. General: Accessories, including edgings, pour stops, end closures, closure strips, cover plates, sump pans, and the like as necessary for complete decking installation.
2. Provide sheet metal accessories of same material, zinc-coating, finish and gauge except where noted or specified to be of heavier material, as deck.
3. Fasteners: Corrosion-resistant, as recommended by manufacturer for conditions.
4. Closures: For open ends of cell runs at columns, walls, openings, and the like.
5. Galvanizing Repair Paint: Complying with ASTM A780.

2.06 FABRICATION

A. Deck Fabrication - General:
1. Fabricate deck and accessories in accordance with SDI Manual.
2. Provide profiles, depths, gauges and lengths for steel deck units as indicated on Structural Drawings and as necessary to provide a complete installation.
3. Fabricate composite deck units with integral embossing or raised patterns to provide mechanical bond with concrete slabs.
4. Whenever possible, fabricate deck units to provide a minimum three span condition.

B. Form flashing associated with metal deck installation from steel sheets conforming to adjacent units.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Check supporting members for correct layout and alignment.
2. Verify that surfaces to receive metal deck are free of debris.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Install deck and accessories in strict accordance with the manufacturer's instructions, SDI Manual, and requirements of Authorities Having Jurisdiction.

B. Construction: Construction loads shall not exceed carrying capacity of deck. Assume complete responsibility for the loading of deck due to construction loads.
1. Locate bundles or packages of deck components on supporting members in such a manner that overloading of any individual members does not occur.
2. Provide planking for use in high traffic areas to protect decking from damage.

C. Deck Installation - General:
1. Place deck panels on supporting framework and bearing on supporting frame.
a. Minimum bearing 2 inches at steel and 4 inches at concrete.
2. Place units flat and square, and adjust to final position with ends accurately aligned but not overlapping, before being permanently fastened. Do not stretch or contract side-lap interlocks.
3. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck. Request approval from Architect for all field cutting not indicated on Drawings.

D. After deck has been aligned, provide permanent connections to the support framing with welds, unless indicated otherwise on the Structural Drawings.
   1. Welding shall be performed by qualified welders experienced in welding light gauge steel as specified in Section 05 05 99, Welding.
   2. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   3. Where mechanical fastening is pre-approved by Architect, locate mechanical fasteners and install according to Drawings. If not indicated on Drawings, comply with deck manufacturer's written instructions for conditions.

E. Provide additional reinforcement, closure pieces and the like at openings as required for strength, continuity of deck, support of other work, according to SDI recommendations unless otherwise indicated. Weld to substrate to provide a complete deck installation.

F. Edge Conditions:
   1. Slab Edge Conditions: Provide necessary framing materials and edge closures where required and coordinate corresponding bracing or shoring.
   2. Edge Closures at Composite Floor Deck: Modify edge closure to ensure that shear connector studs can be properly connected to structural framing. Where possible, weld through the edge closure. Where not possible or where an inadequate weld occurs, cut edge plate at each stud and connect the stud directly to framing.

G. Installation Tolerances:
   1. Edge Location: Plus or minus 1/2 inch from established building working lines. Maintain minimum support dimension recommended by decking manufacturer for conditions.

H. Concrete Placement: Place concrete first over beams and girders rather than at midspan. Do not pile concrete higher than the finished depth of the slab. If overloading is anticipated, select a heavier gauge decking or shore decking during the pouring of concrete.
   1. Furnish temporary shoring as required to maintain position of structures and prevent deflection beyond allowable limits. Ensure construction loads do not exceed deck carrying capacity per manufacturer.

3.03 CONSTRUCTION LOADS

A. Construction loads shall not exceed carrying capacity of deck. Assume complete responsibility for the loading of composite floor deck due to construction loads.

B. Verify with the deck supplier when it is acceptable to place loads on composite floor deck, and verify who shall substantiate that the deck will not be damaged or have a reduced capacity as a result of the proposed construction loads.

C. Do not use deck units for storage or working platforms until permanently secured in position.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: In accordance with Section 01 45 23, Testing and Inspection Services. Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
   1. Field welds will be subject to inspection.
   2. See also, Structural General Notes and Drawings.
   3. Testing agency will report inspection results promptly and in writing to Contractor, Owner and Architect.

B. Remove and replace work that does not comply with specified requirements.
   1. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements

3.05 REPAIRING, CLEANING AND PROTECTION

A. Galvanizing Repairs: Repair galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780 and manufacturer's written instructions at cut edges or locations where coating has been damaged.

B. Cleaning: Prior to placement of concrete or other finish materials, the deck shall be cleaned to be free of debris and water.

C. Protection: Protect to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Miscellaneous ferrous and non-ferrous metal indicated or required to complete the work, except as otherwise indicated.
   a. Miscellaneous steel framing and supports;
   b. Loose bearing and leveling plates;
   c. Miscellaneous steel angles, plates, and shapes.
2. Custom steel angles at edge of roof deck/cable railing, with high performance coating.
3. Include fasteners, mounting clips, washers, connectors and accessories as indicated or required for complete installations.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 05 01 99 - Restoration and Maintenance of Metals
4. Section 05 51 00 - Metal Stairs
5. Section 05 73 16 - Wire Rope Decorative Metal Railings
6. Section 07 52 16 - SBS-Modified Membrane Roofing: steel bracket at roof edge
7. Section 07 62 00 - Sheet Metal Flashing and Trim
8. Section 09 96 00 - High Performance Coatings

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

AISC	• Manual of Steel Construction • Code of Standard Practice for Steel Buildings and Bridges, • Load and Resistance Factor Design (LFRD) Specification for Structural Steel Buildings • Seismic Provisions for Structural Steel Buildings • Specification for Allowable Stress Design of Single-Angle Members, and for Load and Resistance Factor Design of Single Angle Members
ASTM	Standards indicated herein
AWS	Structural Welding Code Standards
NAAMM-AMP 555	Code of Standard Practice for the Architectural Metal Industry
RCSC	Specification for Structural Joints Using ASTM A325/A490 Bolts
SSPC	Volume 1, Good Painting Practice, and Volume 2, Systems and Specifications Editions current as of date of Project Manual
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate with installation requirements for metal fabrications indicated.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:

1. Product Data: For each type of product indicated.
2. Shop Drawings: Show details of fabrication and installation.
3. Samples: For each exposed material.
4. Qualifications Data: For welders.

1.05 QUALITY ASSURANCE

A. Welding Qualifications: Welders shall be AWS/WABO certified. Submit evidence of certification if requested. Welders shall be prequalified for each position and weld type which the welder will be performing

B. Welding: Perform in accordance with AWS, WABO, and regulatory agencies.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Protect metal fabrications from moisture and corrosion until erected.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

2.02 MATERIALS

A. Steel:
   1. Steel Plates, Shapes, Rods and Bars: ASTM A36.
   2. Steel Tubing: ASTM A500, cold-formed steel tubing.
   3. Steel Pipe: ASTM A53, standard weight (Schedule 40), unless otherwise indicated.
   4. Provide rolled shapes, bars, plates, sheets, strips, and the like, as detailed.
   5. Galvanize steel exposed to weather, or embedded in masonry, unless indicated otherwise.

B. Copper: ASTM B370 cold-rolled Red Copper sheet, H00 temper, no less than 16 ounces per square foot, natural weathering finish.

C. Anchorage and Fasteners: Refer to Structural General Notes and Drawings.

D. Sealants: As specified in Section 07 92 00, Joint Sealants, to suit conditions of installation.

E. Epoxy Grout: Refer to Structural General Notes and Drawings.

2.03 METAL FABRICATIONS

A. Miscellaneous Framing and Supports - General: Provide miscellaneous steel framing, and supports which are not a part of structural steel framework, as required to complete work.
   1. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
   2. Equip units with integrally welded anchors for casting into masonry.
   3. Galvanize or prime with zinc-rich primer where indicated.

B. Steel Angles: Fabricate steel angles of sizes indicated. Provide horizontally slotted holes to receive bolts; miter and weld corners. Provide open joints at expansion and control joints.

C. Loose Bearing and Leveling Plates: Loose bearing and leveling plates for steel items bearing on concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication. Prime plates with zinc-rich primer.

D. Miscellaneous Steel Trim: Support angles, brackets, closures, frames, and the like, as indicated or required for complete installation.
   1. Except as otherwise indicated, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges.
   2. Use concealed field splices wherever possible.
   3. Provide shapes and sizes for profiles shown. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.
   4. Galvanize exterior miscellaneous steel trim.
   5. Prime exterior steel trim with zinc-rich primer where indicated to be painted.

E. Rough Hardware: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures.
   1. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

F. Steel Bracket at Roof Edge: As detailed.

G. Other Miscellaneous Steel: As indicated and as required.

H. Copper: As indicated on Drawings. See Section 07 62 00, Sheet Metal Flashing and Trim.

2.04 FABRICATION/WORKMANSHIP

A. Form steel to accurate sizes and shapes, with clean straight lines and angles.
   1. Fit and shop assemble in largest sections, for delivery to site.
   2. Fabricate items with joints fitted and secured. Miter corners of frames with square or angled joints.
   3. Punch and shear to leave clean surfaces.
   4. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
   5. Provide holes and connections for work of other trades.

B. Welding:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Weld permanent connections continuously, and in conformance with AWS welding procedures.
   3. Obtain fusion without undercut or overlap. Remove welding flux immediately.
   4. Make exposed joints butt tight flush, and hairline.
   5. Welds shall be smooth and invisible after finishing; grind exposed joints flush and smooth with adjacent surface (before galvanizing, where galvanizing indicated).
   6. Ease exposed edges to small uniform radius (1/32 inch unless otherwise indicated).

C. Joints and Fastenings:
   1. Detail for ample strength and stiffness.
   2. Where exposed to weather, form to exclude water.

D. Fabricate components required for anchorage of fabrications of same material and finish as fabrication, except where specifically noted otherwise.

E. 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 to be NAAMM Class 2.

2.05 GALVANIZATION

A. Zinc-coated (galvanized) ferrous metal exterior assemblies indicated to be galvanized. Hot-dip galvanize after fabrication and grinding in accordance with ASTM A123 (other steel products) and ASTM A153 (hardware):
   1. Required coating weights per square foot of actual surfaces:
      a. Steel 3/16 inch and Less: 2.0 oz. Average; 1.8 oz. Minimum.
      b. Steel 1/4 inch and Heavier: 2.3 oz. Average; 2.0 oz. Minimum.
   2. Galvanize bolts and similar threaded fasteners, per ASTM A307 Class A, B, C, and D, ASTM A653/A924 - G90 galvanizing process (zinc with tin) for fabricated steel sheet.
   3. Galvanize steel exposed to weather.

2.06 FINISHES

A. Shop-Applied Coatings: Primer and Finish Coatings as specified in Section 09 96 00, High-Performance Coatings.

B. Touch-up for Damaged Galvanized Surfaces:, Tnemec Series 394 PerimePrime", or approved meeting ASTM A780; 2.5 mils dry thickness.

C. Copper, Stainless Steel, and Galvanized (indicated to remain): No shop primer or finish coatings required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation - General:
   1. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
   2. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and have bolted field connections.
   3. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
   4. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
      a. Cast-in Items: Install accurately and securely to detail.
      b. Except as otherwise indicated, embed (uncoated portion) of steel items into concrete and any steel inserts with specified non-shrinking, non-metallic grout.

B. Field Welding: Comply with AWS welding requirements.

C. Install framing and supports to comply with requirements of items being supported.

D. Isolate uncoated dissimilar metals and materials to protect against galvanic action.

E. Miscellaneous: Install metal items indicated or required to complete the work.

3.02 TOUCH-UP AFTER INSTALLATION

A. After erection, remove weld spatter, oil and grease. Clean abraded, bolted and welded areas in accordance with SSPC-SP-3, Power Tool Cleaning.

B. For damaged ferrous metal surfaces, including damage to high performance coatings, request clarification from Architect.

C. For galvanized surfaces clean field welds, bolted connections and abraded areas and apply 1 coat of galvanizing repair paint specified, to comply with ASTM A780. Work shall be free of scratches and stains.

3.03 CLEAN UP

A. Leave premises clean and free from residue of Work of this Section.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Custom steel stairs, including tread/riser structural angle support, and accessories as required.
a. Precast concrete treads/risers as specified in Section 03 48 19.
b. Guardrails and handrails as specified in Section 05 73 16.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: anchoring at base
2. Section 03 48 19 - Precast Concrete Stair Treads: precast treads/risers
3. Section 05 05 99 - Welding: standard procedures including welding
4. Section 05 12 00 - Structural Steel: stair stringers and tread/riser support
5. Section 05 50 00 - Metal Fabrications: miscellaneous steel
6. Section 05 73 16 - Wire Rope Decorative Railings : cable railings
7. Section 09 91 00 - Painting

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

Accessible Design	2010 Standards for Accessible Design (ADA)
AISC	Manual of Steel Construction
ASTM	Standards indicated herein
AWS D1.1	Structural Welding Code - Steel
AWS D1.3	Structural Welding Code - Sheet Steel
ICC A117.1-2009	Accessible and Usable Buildings and Facilities Standards.
MBG 531	Metal Bar Grating Manual
NAAMM-AMP 555	Code of Standard Practice for the Architectural Metal Industry
NAAMM	Standards and Manuals for Architectural Metal Products
NOMMA	National Ornamental & Miscellaneous Metal Association Guideline 1: Voluntary Joint Finish Standards
SSPC	Volume 1, Good Painting Practice, and Volume 2, Systems and Specifications Editions current as of date of Project Manual.
IBC	International Building Code, with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, inserts, and anchor bolts, that are to be embedded in concrete.
2. Coordinate with adjacent construction including blocking/backing.
3. Coordinate work required to accommodate precast treads.
4. Coordinate work of this section with anchorage and connections for guardrails and handrails specified in Section 05 73 16.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer’s literature for stair system and components specified.

2. Shop Drawings. Plans, sections, elevations and details for each stair, including:
   a. Profiles and sizes/dimensions for stair components.
   b. Welds, anchorages and attachment details to the building structure.
   c. Installation clearances.
   d. Support for each type of tread/riser and guardrail.
   e. Coordinate with Shop Drawings for all stair- related materials.
3. Qualifications Data: For fabricator/installer and welder.

1.05 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Shall have a minimum of 5 years of experience in the detailing, fabrication and installation of stairs of quality and type specified in this Section.
   1. Erection: Steel erection to be by steel erectors having experience from projects similar in scope, magnitude and required quality.
   2. Welding: Welding shall be performed by WABO Certified Welders.

B. Quality of Workmanship (exposed steel): Comply with NAAMM and NOMMA Standards indicated.
   1. Class 1 (Architectural Metals):
      a. Exposed surfaces are finished smooth with pits, mill marks, nicks and scratches filled or ground off. Defects should not show when painted or polished.
      b. Welds should be concealed where possible. Exposed welds are ground to small radius with uniform sized cove unless otherwise noted.
      c. Distortions should not be visible to the eye.
      d. Exposed joints are fitted to a hairline finish.
   2. NOMMA (welding class for joint finish): Finish #1: No evidence of a welded joint.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Ship components in largest possible sections to minimize field welding.
   2. Delivery: Protect during shipping. Verify undamaged condition at site.
   3. Storage: Store in warm, dry location and store carefully to prevent damage.
   4. Handling: Protect from abuse or misuse at all times. Bent, scratched, or otherwise damaged items will not be accepted.

1.07 PROJECT SITE CONDITIONS

A. Field Measurements: Field verify conditions at the project site and adjust final Shop Drawings to reflect actual conditions and field dimensions.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC and ASCE 7.
   2. Seismic: Metal stairs and railings shall be capable of withstanding the effects of earthquake motions determined in accordance with IBC.
   3. Accessibility: Comply with 2010 Standards for Accessible Design (ADA) and A117.1.
      a. Per ADA-ABA and ICC/ANSI A117.1, in areas required to be accessible, floor openings shall be limited to 1/2 inch in width.

B. Structural Performance Requirements:
   1. Stairs shall be self-supporting between landings, and transfer lateral loads into floor slab and or supporting structure without inducing torsion or bending.

2. Handrails and Guards: Design and fabricate handrail and guardrail assemblies to meet or exceed the following:
   a. Resist a linear load of 50 pounds per linear foot,,per ASCE 7, Section 4.5.1.1.
   b. Resist a concentrated load of 200 pounds, per ASCE 7, Section 4.5.1.
   c. Intermediate Rails (all those except the handrail), Balusters and Infill: Design to resist concentrated load of 50 pounds, per ASCE, Section 4.5.1.2.
3. Treads: Shall withstand 100 lb. uniform load and 300 lb. concentrated load applied on an area of 4 square inches or on individual treads.
4. Loads not assumed to act concurrently.
5. Allow for thermal movement; maximum temperature range 120 deg F ambient, and 180 deg F material surfaces.

2.02 STAIRS

A. Stairs: Straight run, NAAMM Commercial Class.
   1. Dimensions, spans, and structural conditions as indicated on Drawings.

B. Stringers: ASTM A36 structural grade, hot-rolled commercial grade tube steel; sizes and thickness as indicated, unless larger/thicker is required by engineering calculations.

C. Treads/Risers: Continuous precast concrete tread/riser units with integral contrasting stripes as specified in Section 03 48 19 Precast Concrete Stair Treads.
   1. Structural Support: Sizes and thickness for steel angle tread/riser support as indicated on Drawings. Coordinate supports with precast treads in Section 03 48 19 as required.

D. Cable Railings: As specified in specified in Section 05 73 16, Wire Rope Decorative Railings. Coordinate attachment to stairs stringers as required.

2.03 MATERIALS

A. General: Provide shapes, bars, plates, sheets, strips, accessories, and the like, as detailed or required for complete installations.
   1. Sizes, dimensions, and configurations as indicated on Drawings.

B. Steel:
   1. Structural Steel Shapes, Plates and Bars: ASTM A36.
   2. Steel Sheet:
      a. Structural Use: ASTM A1011 (hot rolled).
      b. Non-Structural Use: ASTM A786, ASTM A1008.

C. Electrodes: AWS, to suit materials being welded. See Section 05 05 99, Welding.

D. Fasteners: Materials as recommended by manufacturer to suit Project conditions.

2.04 FABRICATION

A. Coordinate fabrication as required to accommodate treads, guardrails and handrails.

B. Fabrication of Stairs – General:
   1. Fabricate in accordance with IBC, ADA, NAAMM, NOMMA and referenced standards.
   2. Construct all-welded structural quality assemblies unless indicated otherwise.
   3. Fit and shop assemble continuous runs in largest practical size for delivery to site.
   4. Use materials free of defects and irregularities.
   5. Form steel to accurate sizes and shapes, with clean lines and angles.

6. Framing: Fabricate stringers to comply with design and dimensions indicated, and as required to comply with Performance Requirements.
7. Fabricate steel support for stringer connections at each end of precast tread.
   a. Weld steel tread support angles to stringer from top side; welding from bottom side not accepted unless method/sample pre-approved in writing by Architect.
   b. Coordinate with threaded inserts cast-into precast concrete treads, bolted to support angles.
8. Drill and tap holes prior to shop-applying primer.
9. Complete the assembly, including welding of units, prior to shop-applying primer.

C. Welding: Comply with AWS welding standards and NAAMM Class 1.
1. Weld stringers, and tread and railing support to form integral units.
2. Exposed Joint Finishes at Stair Stringers, Tread/Riser Support: Conform to NOMMA Finish No.1.
3. Make exposed butt joints tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where indicated otherwise.
1. Accurately form components required for anchorage of stairs to structure.

2.05 FINISHES

A. Painted Finishes: Comply with NAAMM.
1. Substrate Preparation: Completely remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or foreign matter from steel in accordance with SSPC SP2.
2. Shop-Applied Primer: Immediately after fabrication and cleaning, apply primer coat specified in Section 09 91 00, Painting. Do not prime surfaces in direct contact with concrete or to be field welded.
3. Field-Applied Finish Coatings: As specified in Section 09 91 00.
4. Colors: See Finish Schedule on Drawings for colors.

B. Touch-Up/Repair: Use specified coating product in field or at fabricator's shop. Follow coating manufacturer's directions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Verify that proper structural support is in place, including backing/blocking for attachment of railings to walls.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Supply items required to be cast into concrete, and placed in partitions with setting templates, to appropriate Section.

3.03 INSTALLATION

A. Install in accordance with provisions of the Contract Documents including ADA.

B. Set stair units in position indicated, true to line, plumb, level, accurately fitted, and secure.
   1. Provide anchors, plates, angles and expansion bolts and the like, as required for connecting stairs to structure and railing to base.
   2. Permanently secure stairs in place, using concealed anchorage whenever possible. Bolt and weld steel construction to match shop bolting and welding. Weld permanent connections; welds shall be grind smooth and flush.
   3. Joints shall be butted tight, with hairline neatly fitted joints, and intersections.
   4. Coordinate installation of precast treads and cable railings to provide secure assemblies and clearance complying with IBC and ADA.
   5. Leave assemblies securely rigid and free from defects and distortions.

C. Erection Tolerances:
   1. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
   2. Maximum Offset from True Alignment: 1/4 inch.
   3. Maximum Out-of-Position: 1/4 inch.

D. Dissimilar Materials: Protect against galvanic action from uncoated dissimilar materials.
   1. Except as otherwise indicated, embed (uncoated portion) of steel items into concrete and any steel inserts with specified non-shrinking, non-metallic grout.

E. Work shall be free of scratches and stains. After installation, where steel is indicated to be painted, clean steel in preparation for specified coatings in accordance with SSPC SP-1 and coating manufacturer's instructions.

3.04 ADJUSTING AND CLEANING

A. Reposition any misaligned units.

B. Clean exposed surfaces in accordance with manufacturer’s recommendations.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Custom cable railing systems for exterior and interior guardrails, including stainless steel posts, components, cables and fittings, as indicated.
2. Hardwood top rail and handrail as indicated.
3. Accessories as required for a complete installation.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures: installation at existing roof edge
2. Section 05 12 00 - Structural Steel: stair stringers, brackets and tread supports
3. Section 05 50 00 - Metal Fabrications
4. Section 05 51 00 - Metal Stairs
5. Section 06 10 00 - Rough Carpentry
6. Section 07 62 00 - Sheet Metal Flashing and Trim: flashings at roof deck edges
7. Section 07 76 00 - Roof Pedestals and Pavers: system containment at deck edges

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

Accessible Design	2010 Standards for Accessible Design (ADA)
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASTM	Standards indicated herein
AWS D Series	Structural Welding Code
NAAMM-AMP 555	Code of Standard Practice for the Architectural Metal Industry
NAAMM	Standards and Manuals for Architectural and Metal Products
NOMMA	National Ornamental & Miscellaneous Metal Association Guideline 1: Voluntary Joint Finish Standards
SSPC	Volume 1, Good Painting Practice, and Volume 2, Systems and Specifications
IBC	International Building Code, with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate requirements of substrates, anchorage, flashings, finishes and the like required for complete installation of railings.
2. Coordinate Shop Drawings with pedestal/pavers, flashings, roofing and wood rail.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each railing component indicated.
2. Shop Drawings: Show dimensions, sizes, thicknesses, gauges, finishes, anchorages, joining methods, and fabrication details.
a. Include erection, reinforcement, embedment details and other information.
3. Engineering Calculations: Delegated design shop drawings and calculations shall be stamped by a qualified professional engineer licensed in State of Washington.
4. Samples of typical section of system assemblies:

a. 12 inch length of each cable rail, post and component in material and finish specified.
b. Brackets and accessories one of each type.
c. Hardwood Rails: 12 inch length of each, in material and finish specified.

5. Certificates: Manufacturer's letter certifying that specifications have been followed, including specified shop finish procedures.
6. Qualifications Data: For manufacturer and installer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Shall have a minimum of 5 years of experience in the detailing and fabrication of railings of quality and type specified in this Section.

B. Installer Qualifications: Shall have a minimum of 5 years of experience in the installation of railings of quality and type specified in this Section.

C. Quality of Workmanship (exposed steel): Comply with NAAMM Standards indicated.
1. NAAMM Class 1 (Architectural Metals):
a. Exposed surfaces are finished smooth with pits, mill marks, nicks and scratches filled or ground off. Defects should not show when painted or polished.
b. Welds should be concealed where possible. Exposed welds are ground to small radius with uniform sized cove unless otherwise noted.
c. Distortions should not be visible to the eye.
d. Exposed joints are fitted to a hairline finish.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Delivery: Protectively wrap and package. Verify undamaged condition at site.
2. Storage: Store in warm, dry location and store carefully to prevent damage.
3. Handling: Protect from abuse or misuse at all times. Bent, scratched, or otherwise damaged items will not be accepted.

1.07 PROJECT SITE CONDITIONS

A. Field Measurements: Verify dimensions of supporting structures and conditions at the project site and adjust final Shop Drawings to reflect actual field dimensions.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
1. Special Product Warranty: Installer's 2-year warranty against failure including failure of cable tensioning.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC, and ASCE 7.
2. Seismic: Metal stairs and railings shall be capable of withstanding the effects of earthquake motions determined in accordance with IBC.
3. Accessibility: Comply with 2010 Standards for Accessible Design (ADA) and A117.1.

B. Design Requirements:

1. Delegated Design: Engage a qualified professional engineer licensed in the State of Washington to provide engineering calculations and shop drawings, for wire rope railings and imposed loads meeting criteria indicated.
2. Railings shall transfer lateral loads into supporting structure without inducing torsion or bending.
3. Allow for thermal movement; maximum temperature range 120 deg F ambient, and 180 deg F material surfaces.

C. Structural Performance Requirements:
1. Handrails and Guards: Meet or exceed IBC Chapter 10 and 16. Design and fabricate handrail and guard assemblies to meet or exceed the following:
   a. Resist a linear load of 50 pounds per linear foot,,per ASCE 7, Section 4.5.1.1.
   b. Resist a concentrated load of 200 pounds, per ASCE 7, Section 4.5.1.
   c. Intermediate Posts and Infill: Design to resist concentrated load of 50 pounds, per ASCE, Section 4.5.1.2.
      1) End Posts: Shall be able to support the minimum of the cable tension, or 350 pounds per the number of cables.
2. Loads not assumed to act concurrently.

2.02 MANUFACTURERS – CABLE GUARDRAIL SYSTEMS

A. Manufacturers:
1. American Metal Specialties, Inc.
2. C. Sherman Johnson Co, Inc. (C.S. Johnson).
3. Feeney Stainless Steel Cable Rail.
4. Ultra-Tec.
5. ViewRail.
6. Or approved.

B. Product: Basis of Design: ViewRail systems and components indicated.

C. Submit substitution requests in accordance with Section 01 25 00, Substitutions and Product Options. Include samples of cable rail components.

2.03 CABLE GUARDRAIL SYSTEMS

A. Cable Guardrail System: ViewRail “Signature” Cable Rail System.
1. Description: Custom, field adjustable system, including post supports and manufactured cable infill and tensioning devices, complying with regulatory requirements, and performance requirements indicated.
2. Configure guardrail and assemblies as indicated on Drawings.
3. Posts: 2 inch square stainless steel tubes with base plates and mounting type as indicated, wall thickness as required to meet or exceed performance requirements.
4. Cable:
   a. Type 316 stainless steel.
   b. Size: 1 x 19, 5/32 inch stainless steel.
   c. Cable Tension: 150 pounds.
   d. Breaking Load Limit: 2,000 pounds.
5. Fittings: Manufacturer’s “Installation Kits” with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
   a. Kits as required for railing conditions indicated on Drawings.
      1) Level Tension Kit to Level Tension Kit;
      2) Inside Post Mount to Level Tension Kit;
      3) Angle Tension Kit to Angle Tension Kit;
      4) Inside Post to Angle Tension Kit.
6. Top Rails: ViewRail “6001 Ipe Handrail”.

7. Handrail: 1 1/2 inch diameter stainless steel, brushed finish.
8. Brackets:
   a. Top Rail: Flat Top Bracket and Universal Bracket.
   b. Handrails: Post Side Handrail Bracket, adjustable.
9. Fasteners and Anchors: Material recommended by manufacturer, designed for intended use and function, and compatible with contacting materials.

B. Cable Rail System Accessories: Plugs, post levelers, foam inserts, shims, and other accessories as required for a complete installation.

C. Equipment: Installation equipment as recommended by cable railing manufacturer.

2.04 MATERIALS

A. Stainless Steel: Type 316.

B. Hardwood: Ipe hardwood, kiln dried, moisture content 10-18 percent at time of delivery. Top rail surfaces eased on four sides (E4E).
1. Size and Configuration: As indicated on Drawings.

C. Miscellaneous Items: Provide other materials and items required to complete the work.

2.05 ACCESSORIES

A. Anchors, Brackets, and Plates: As required for securing railings to stair stringers, and to structure. Refer to Drawings.

B. Fasteners: As determined by engineering calculations, and as recommended by manufacturer for conditions of installation.

C. Miscellaneous Cable Rail System Accessories: Plugs, post levelers, foam inserts, shims, and as required for a complete installation.

D. Equipment: Installation equipment as recommended by cable railing manufacturer.

2.06 FABRICATION

A. General - Railing:
1. Fabricate structural quality pre-assembled railing systems indicated.
2. Provide continuous runs in largest practical size for delivery to site.
3. Fabricate to true lines; comply with design, dimensions and details indicated, but not less than that required to support structural loads.
4. Welded Connections: Weld all around at connections including at base plates, and grind smooth.
5. Fabricate components with joints tightly fitted and secured.
6. Allow for expansion and contraction.
7. Accurately form railing components to suit building structure.
8. Drilled Holes; Drilled and Tapped Holes: Drill prior to finishing.

B. Wood Railings:
1. Fabricate hardwood top rail to dimensions and configuration indicated, with mitered corners, eased edges, and finish indicated.
2. Fabricate hardwood handrail to dimensions, configurations, and finish indicated.

2.07 FINISHES

A. Stainless Steel: Do not prime or paint stainless steel.

B. Ipe Hardwood: No finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
   1. Verify that proper structural support is in place, including brackets for attachment of railings to edge of existing concrete roof and edge of interior mezzanine slab.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Supply items required to be cast into concrete, and anchored through concrete or structure, with setting templates, to appropriate Section.

3.03 INSTALLATION

A. Installation - General: Install in accordance with manufacturer's installation instructions and provisions of the Contract Documents including structural performance requirements.
   1. Do not install damaged components.
   2. Erect assemblies plumb, true to line, in location and elevation indicated on Drawings.
   3. Perform field welding only where approved by Owner and Architect.
   4. Secure systems at slab edges as indicated; coordinate with roofing installation.
   5. Allow for expansion and contraction.

B. Cable Railings: Install in accordance with manufacturer’s recommendations, using manufacturer provided cables, fittings, and hardware, within post system meeting structural requirements determined by delegated design.
   1. Terminate and tension cables as recommended by cable fittings manufacturer.
   2. Tension cables to the amount, in sequence, as recommended by manufacturer.
   3. Cables shall be parallel and without kinks.
   4. Allow for expansion and contraction.
   5. Reposition any misaligned units.

C. Dissimilar Materials: Protect against galvanic action from uncoated dissimilar materials.
   1. Except as otherwise indicated, embed (uncoated portion) of steel items into concrete and any steel inserts with non-shrinking, non-metallic grout.

3.04 CLEANING AND REPAIR

A. Clean exposed surfaces in accordance with manufacturer’s recommendations.

B. Repair: Installed Work shall be free of scratches and stains. Repair damaged finishes in accordance with finish coating manufacturer’s instructions.
   1. Replace damaged components unable to be repaired to satisfaction of Owner.

END OF SECTION

DIVISION 06
WOOD, PLASTICS AND COMPOSITES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Rough carpentry items including but not limited to:
a. Non-structural blocking, backing, nailers, furring, shims, plywood, and the like.
2. Miscellaneous auxiliary materials, fasteners, anchors, and accessories as required.

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

AF&PA	National Design Specification for Wood Construction WCD 1, Details for Conventional Wood Frame Construction
AITC	Timber Construction Manual
ALSC	American Lumber Standard Committee
APA	APA Design/ Construction Guide
ASTM	Standards indicated herein
AWPA	M4, Care of Preservative Treated Wood Products U1, Use Category System
ICC-ES	International Code Council, Evaluation Services
PS 1	Construction and Industrial Plywood
PS20	American Softwood Lumber Standard
WCLIB	Standard Grading and Dressing Rules for West Coast Lumber
WWPA	Grading Rules for Western Lumber
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate blocking and other rough carpentry where indicated.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each type of product specified.
2. Fire-Retardant Treatment: Current ICC-ES Evaluation Reports for wood treatment, Flameproof Certification, and manufacturer's instructions for treating field cuts.
3. Preservative Treatment: Treating plant’s certification for each type of treatment and species used, stating solution type, depth of penetration, and net amount of preservative retained, and certifying compliance with indicated standards.
4. Certifications: Grading certifications and moisture certifications if requested by Owner.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Do not store seasoned materials in wet or damp portions of building.
2. Plywood: Replace material that exceeds maximum moisture content indicated.
3. Deliver finish carpentry materials to jobsite only after painting and wet work is complete.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC, including seismic.

2.02 GENERAL REQUIREMENTS

A. General:
1. Grading rules of referenced associations and standards apply to materials indicated.
2. Provide materials fabricated with no added urea formaldehyde.
3. Adhesives used for wood substrate within the vapor barrier shall have maximum VOC content of 30 g/L when calculated per 40 CFR 59, Subpart D (EPA Method 24).

B. Grading and Marking:
1. Lumber: Factory mark each piece of lumber with the grade stamp of grading agency indicated, or agency certified by ALSC Board of Review.
2. Plywood: Stamp each sheet with the mark of a recognized association or independent inspection agency, identifying the plywood by species group or span rating, exposure durability classification, grade, and compliance with PS1.

C. Moisture Content:
1. Maximum moisture content of wood products at the time of delivery to the job site:
   a. Lumber Interior Dry Conditions: Maximum 19 percent.
   b. Lumber Interior Wet, Exterior Wet and Dry: Expected to exceed 15 percent.
   c. Plywood: Maximum 16 percent at time of testing; 18 percent at time of shipment.
2. Materials other than listed: Moisture content shall comply with standard under which product is produced.

2.03 MATERIALS

A. Lumber - General: DOC PS 20.
1. WWPA and applicable grading rules of inspection agencies.
2. Species and Grade: Construction or No.2 grade lumber of any species.
   a. Lumber used for attachment of other construction: Utility, Stud, or No. 3 grade.
3. Surfacing: Lumber shall be surfaced four sides (S4S).
4. Sizes: Size references are nominal, unless otherwise specified.

B. Plywood: DOC PS 1.
1. APA A-B Exterior Marine Grade plywood.
2. Plywood Equipment Backing Panels: Fire-retardant treated.
3. No OSB is allowed.
4. Sizes and Thickness: As indicated. If not indicated, not less than 1/2 inch thick nominal.

2.04 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous non-structural lumber for support or attachment of other construction, including but not limited to the following:
1. Blocking and backing.
2. Nailers.
3. Furring.
4. Grounds.

B. For non-structural lumber used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with the attachment of other work.

2.05 WOOD TREATMENTS

A. Preservative Treatment by Pressure Process: Comply with requirements of AWPA Standards, and AHJ.
   1. Treatment Methods: Treat wood or lumber (required to be treated) in accordance with AWPA Standard U1, use category (UC) as suitable for end use of treated wood:
      a. UC-2 (interior construction not in contact with ground).
      b. UC-3b (exterior construction not in contact with ground).
   2. Preservative Chemicals: Acceptable to AHJ and containing no arsenic or chromium.
   3. Kiln-dry after treatment to maximum moisture content of 19 percent for lumber. Do not use material that is warped or does not comply with requirements for untreated material.
   4. Mark lumber with treatment quality mark of agency approved by ALSC Board.
   5. Application: Treat items indicated on Structural General Notes and following:
      a. Cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
      b. Sills, blocking, furring, stripping, floor plates installed over concrete slabs-on-grade and similar concealed members in contact with concrete.

B. Fire-Retardant Treatment: Comply with EPA regulations, with AWPA Standards, and have current ICC-ES Evaluation Report acceptable to AHJ.
   1. Treatment Methods: Treat lumber and plywood indicated to be treated, in accordance with AWPA Standard U1, use category (UC) as suitable for end use of treated wood:
      a. UC-FA (Fire Retardant Interior).
   2. Performance: Maximum flame spread index of 25, tested per ASTM E84, unless more stringent rating required by AHJ.
      a. Treatment shall not promote corrosion of metal fasteners.
   3. Kiln-dry after treatment to maximum moisture content of 16 percent for plywood.
   4. Identify treated wood with appropriate classification marking of qualified testing agency.
   5. Furnish preservative solution for liberal application to cut members on job site.
   6. Application: Plywood equipment backing panels.

2.06 ROUGH HARDWARE AND ACCESSORIES

A. Rough Hardware:
   1. Fasteners: Provide fasteners and anchors of material, type, size and finish required for secure anchorage, and suitable to each existing and new substrate and condition.
   2. Bolts: ASTM A307. See Structural General Notes.
   3. Nails: See Structural General Notes.
   4. Use recessed screws, finish or casing nails for exposed work, unless otherwise indicated.
   5. Use stainless steel when exposed to weather, and when in contact with preservative treated wood or concrete.
   6. See Section 07 62 00 Sheet Metal Flashing and Trim, for limitations related to copper.

B. Adhesives: Low VOC, suitable to conditions, and recommended by adhesive manufacturer.
   1. Glue for Woodwork: Aliphatic-resin, polyurethane, or resorcinol wood glue, waterproof for work subject to moisture; AWS Type I or Type II, best quality for intended use.

C. Miscellaneous Materials and Products: Size, type, material, and performance as indicated or as recommended by applicable standards.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Rough Carpentry: Install rough carpentry work in accordance with provisions of the Contract Documents, and recommendations of APA and other referenced standards.
   1. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate to comply with requirements for attaching other construction.
   2. Provide wood blocking/backing in walls for support of required wall-mounted items indicated. Verify exact location at time of construction.
   3. Anchor and fasten rough carpentry work securely to substrates as required to support applied loading and seismic requirements.
   4. Anchor blocking and nailers to other construction as indicated.
   5. Countersink bolts and nuts flush with surfaces.

B. Miscellaneous Rough Carpentry: Request clarification if encounter condition not specified or detailed.

C. Electrical Panels: Install fire-retardant-treated plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install with classification marking of testing agency exposed to view.

D. Cuts in Treated Wood: Field apply wood treatment to cuts in treated wood in accordance with manufacturer's instructions.

3.02 REPAIR AND CLEANING

A. Repair or replace exterior finish carpentry damaged, stained, scratched or otherwise disfigured prior as directed by Owner.
   1. Repairs shall match undamaged work.
   2. Replace items where repairs are noticeable from 3 foot distance.

B. Clean exposed surfaces to remove dirt and foreign materials from exterior finish carpentry upon completion of installation.

END OF SECTION

DIVISION 07
THERMAL AND MOISTURE PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Clear, penetrating water-repellent and graffiti-resistant coatings on exterior, exposed, vertical surfaces of the following:
a. Brick.
b. Concrete.
c. Cast stone parapet caps.
2. Pre-application mock-ups.
3. Field testing.

B. Related Sections:
1. Section 01 43 39 - Mock-Up Requirements
2. Section 04 01 20.52 Masonry Cleaning
3. Section 04 01 20.91 Masonry Restoration
4. Section 07 92 00 - Joint Sealants

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
BIA TN 6A	Tech Note 6A: Colorless Coatings for Brick Masonry
Rilem Test	Method 11.4 - Water Absorption Under Low Pressure (Pipe Method)

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate cleaning of substrates to receive water repellent coatings.
2. Coordinate installation of joint sealants prior to beginning water repellent application.

B. Pre-Installation Meeting: Convene to review environmental regulations, test panel/mock-up, protection, surface preparation, application, field quality control, and cleaning.

C. Sequencing and Scheduling: Apply water repellents following brick restoration, masonry cleaning, and application of joint sealants.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Technical data for each type of product.
2. Manufacturer’s application instructions and general recommendations.
3. Location Plan: Include each substrate and proposed application materials/methods.
4. Clean Up and Disposal Plan: Submit a plan for spill control, spill cleanup and disposal of waste for approval of Owner before storage and application.
5. Manufacturer’s Certifications:
a. Statement certifying compatibility with adjacent materials.
b. Upon completion, statement certifying that applications complied with specifications, and regulatory requirements.
6. Pre-Application Field Reports: Field Test results and photographs.

7. Qualification Data: Applicator/installer.
8. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Maintenance Data: For repellents, to include in maintenance manuals.
   2. Warranty documentation.
   3. Maintenance Materials: Provide 1 gallon of graffiti remover at project completion.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Shall have a minimum of 5 years of experience in the manufacture of repellent materials of the type specified, and the following:
   1. Contact information for Owner and Architect for 3 applications over 5 years old.
   2. Maintain a locally available trained technical representative to perform tests, make evaluations, certify results, and perform field services as required.

B. Applicator/Installer Qualifications: Shall have a minimum of 3 years of experience in the application of materials of the type specified, and the following:
   1. Shall be trained and or approved by water- and graffiti-repellent manufacturer.

C. Single Source Responsibility: Provide water-repellents and anti-graffiti repellent products from single manufacturer or under direct responsibility and Warranty of single manufacturer.

D. Pre-Application Mock-Up/Project Field Test Panel:
   1. Manufacturer's technical representative shall perform testing, verifications, and inspections as necessary to determine product use and to obtain specified Warranty.
   2. Apply repellents to directly to vertical surfaces in locations as directed by Architect, to determine compatibility, coverage, and aesthetic effects before proceeding with application. Mock-ups shall establish quality standards for materials and execution.
      a. Size: Minimum 16 sq.ft. area for each substrate and each product proposed.
      b. Overlap water-repellents to illustrate appearance differences due to build-up at run-downs, and due to overlapping layers at adjacent applications on same wall.
   3. Brick: Perform Rilem Tube tests on both brick and mortar joints. Perform other tests in accordance with repellent manufacturer's instructions. Perform same tests for concrete and cast stone.
      a. Acceptable Test Result: As indicated in 2.03-B-2-b below.
   4. Allow 10 days before evaluating.
   5. Graffiti Removal: Apply paint or other graffiti materials provided by Owner, to test panel and allow to dry for 24 hours. Apply cleaner to test ease of removal.
   6. Acceptance of manufacturers and products by Architect is based upon acceptance criteria from inspections and testing results including:
      a. Little or no change in hue, shade, and sheen between water-repellents, graffiti repellents, and uncoated substrate material.
      b. Retention of water repellency. Perform Spray Test with garden hose spray nozzle located approximately 10 feet from wall and aimed so water strikes at 45 degree downward angle.
      c. Successful graffiti removal.
   7. Repeat tests as needed to determine acceptability based upon performance and appearance criteria. Do not begin full-scale application until accepted by Architect.
   8. Protect test areas accepted by Architect as standard of quality for work of this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver materials in original labeled and sealed containers.

2. Store in dry place, protected from freezing and from harmful temperature extremes. Maintain temperature between 45 deg F and 100 deg F during storage.
3. Handling: Protect from contamination or adulteration.

1.07 PROJECT SITE CONDITIONS

A. Environmental Requirements:
1. Conform to environmental precautions and conditions recommended by manufacturer.
2. Surface and Air Temperatures: Apply between 40 deg F and 90 deg F.
3. Weather: Do not work on surfaces during precipitation, where substrate is wet, frozen, or less than 40 deg F, when inclement weather or high winds are forecast or expected before finishes can dry and cure. Allow surfaces exposed to rain to dry for a minimum of 24 hours.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
1. Specified Product Warranty: Manufacturer's 10-year Material warranty agreeing to provide replacement product, when water repellent applied per manufacturer's instructions and with no graffiti removal, allows penetration of water to occur.
2. Manufacturer's technical representative shall perform Pre-Application Mock-Up/Field Test Panel testing, and the substrate inspection, application observation, and field verifications/testing as required to ensure compliance with warranty.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC and Authorities Having Jurisdiction (AHJ).
2. Products shall meet or exceed applicable VOC requirements of EPA and PSCAA.

2.02 MANUFACTURERS

A. Manufacturers:
1. Diedrich Technologies, Inc.
2. EVONIK, through Salleeco Inc.
3. ProSeal Corp.
4. Prosoco
5. Or approved.

B. Product: Basis of Design: Prosoco products indicated.

2.03 WATER-REPELLENT SEALER AND GRAFFITI CONTROL

A. Water-Repellent Sealer and Graffiti Control: Prosoco "Weather Seal Blok-Guard & Graffiti Control WB 15 or VOC 15 (formerly Ultra 15)".
1. Description: Clear, high-performance, penetrating, breathable, liquid water-repellent, formulated to weatherproof porous masonry, concrete and cast stone, with little or no change to the natural appearance. UV-stable.
2. For vertical surfaces.
3. Coverage rate as recommended by manufacturer.
4. Water repellent sealers and non-sacrificial graffiti-repellent coating systems may be separate products or combined into a single product.

B. Performance:
   1. Chemical Formulations: Deep, penetrating (non-topical), forming a UV-stable, chemical bond and hydrophobic structure within masonry, concrete, and cast stone substrate pores, that repels dirt, staining, and moisture.
   2. Total Solids: Minimum 15 percent.
   3. Water Absorption Reduction (brick): Greater than 99 percent, tested per ASTM C67.
   4. Water Vapor Transmission: Minimum 97 percent retention for WB 15, tested per ASTM D6490 (82 percent for VOC 15).
   5. Visibility: No residue, surface film or significant darkening or color change from original surfaces at application areas, including at overlapping water repellents and graffiti-resistant coatings.

C. Graffiti-Removal: Prosoco “Graffiti Remover” or “Enviro Klean SafStrip”; or graffiti remover manufactured by or approved by water repellent manufacturer, with proven compatibility with materials being used.

D. Substrate Cleaner: Compatible with cleaning method specified in Section 04 01 20.52, Masonry Cleaning, recommended by water repellent manufacturer, and accepted by Architect in pre-application test panel mock-ups.

2.04 EQUIPMENT

A. Spray Equipment: High volume, low-pressure (50 psi) spray equipment with stainless steel or brass fittings and gaskets, with fan spray tips.

B. Small Scale Applications: Brush or roller apply using nylon or other synthetic material resistant to solvent solutions. Consult manufacturer for application instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
   1. Examine substrates for defects adversely affecting execution and quality of work.
   2. Ensure that repair/restoration and cleaning work is complete, and that repair has aged, dried, and cured before applying water repellents.
   3. Ensure that joint sealants have been installed a minimum of 24 hours prior to application of water repellents and anti-graffiti coatings.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Thoroughly clean substrate of substances which might interfere with penetration, adhesion, and or performance of water repellents.

B. Testing of Substrates: Test masonry substrates no less than 4 locations on each elevation for brick, 4 lineal feet of cast stone parapet, and one concrete sill, to verify compliance with manufacturer's instructions:
   1. Moisture Content: Rilem test, and test as recommended by repellent manufacturer to ensure that moisture vapor drive is complete and surfaces are sufficiently dry.
   2. Test pH of surfaces.
   3. Notify manufacturer's technical representative at least 48 hours prior to beginning application. Apply no material until manufacturer's technical representative has approved proposed substrate preparation, application and equipment.

C. Protect adjoining work including sealant bond surfaces, from spillage or blow-over water repellent. Cover adjoining metal and glass surfaces; cover plant materials with drop cloths.
   1. Clean water repellent from surfaces immediately after spillage, using materials and methods recommended by water repellent manufacturer.

3.03 APPLICATION

A. Two-Coat Application – Water Repellent:
   1. Apply a heavy saturation spray coating of water repellent on wet surfaces (wet-on-wet) indicated for treatment, using low pressure spray equipment. Comply with manufacturer's instructions. Do not dilute products.
      a. Use airless spraying procedure. Spray from bottom up.
      b. Apply coating at rate used on mock-up sample accepted by Owner/Architect.
      c. Do not over-apply. Immediately remove runs, drips, and excess material, to ensure uniform appearance.
      d. Let application penetrate surfaces 2 to 3 minutes, to ensure complete coverage.
   2. Apply second saturation coat as soon as first coat is dry to the touch, or within two hours of first coat. Allowing more than two hours between coats reduces the effectiveness of second coat.
   3. Protect surfaces from rain for a minimum of 4 to 6 hours.
   4. Allow second coat to fully cure for 3 to 5 days.

B. Anti-Graffiti Coatings: Apply in accordance with manufacturer’s instructions, at rate used on mock-up sample accepted by Owner/Architect.
   1. Where water repellent sealers and anti-graffiti coatings are applied as separate products, apply from ground level to height indicated. Terminate at top edge of nearest mortar joint to limit visible differences between systems.

3.04 FIELD QUALITY CONTROL

A. Field Testing: Manufacturer's technical representative shall provide inspection of substrate, observation of application, and assistance as requested, and as required for warranties.
   1. Verify that coverage rates and acceptance criteria match Owner/Architect-approved Field Sample mock-ups.
   2. Spray Test: Test with garden hose spray nozzle located approximately 10 feet from wall and aimed so water strikes at 45 degree downward angle. Test first 500 square feet and then twice on each elevation in location directed by Architect.
   3. Provide written Field Reports to Contractor, Owner and Architect.

3.05 CLEANING

A. Immediately remove staining and repellents from adjoining surfaces per manufacturer's instructions. Remove temporary protection, and legally dispose of waste.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Below-grade, underslab vapor retarder sheeting installed over prepared subgrade at interior concrete slabs on grade.
2. Seam tape, mastic and accessories as required for complete installation.

B. Related Sections:
1. Section 00 31 00 - Available Information: geotechnical report
2. Section 02 41 19 - Selective Building Demolition
3. Section 03 30 00 - Cast-in-Place Concrete

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ACI 302.IR	Guide for Concrete Floor and Slab Construction
ACI 302.2R	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ASTM	Standards indicated herein
IBC	International Building Code with City of Mercer Island amendments

B. Definitions:
1. Water Vapor Permeability: Coefficient of permeance to unit film thickness. Do not use except where film thickness is known and material is homogeneous.
2. Water Vapor Permeance: Ratio of unit water vapor transmission (WVT) to vapor pressure between two parallel surfaces of a flat material of known thickness.
3. Water Vapor Transmission Rate: Described by ASTM E96 as steady water vapor flow in unit time through unit area between specific parallel surfaces of a material, under specific conditions of temperature and humidity at each surface.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate concrete work to ensure no penetration of vapor retarder; seal approved penetrations prior to placement of concrete.

B. Pre-Installation Meeting: Convene to review substrate, penetrations and other conditions.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer's literature for each material and accessory indicated.
2. Manufacturer’s current recommended installation methods.
3. Samples:
   a. Sheet material: 12 inch x 12 inch sample.
   b. Pipe boot.
4. Certified Test Data: Manufacturer’s test data illustrating compliance with ASTM E1745 and performance specifications, certified by independent testing agency.
5. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Geotechnical Report: Available to bidders for information only and is not a Contract Document.
   1. Do not follow Geotechnical Report recommendations that differ from Contract Document provisions. Where in conflict, verify with Architect.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Take precautions to prevent puncturing, tearing and damage to vapor retarder sheeting.

1.07 PROJECT SITE CONDITIONS

A. Do not apply vapor retarder sheeting during inclement weather or when air temperature exceeds manufacturer’s recommended limits.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
   1. Specified Product Warranty: Manufacturer's warranty that the product meets ASTM E1745 and the testing in accordance with ASTM Standards indicated in 2.03 below; and provides "Life of the Building" material warranty against defects in manufacturing, agreeing to replace product (or at manufacturer's discretion refunds original cost of materials), when installed with proprietary and vapor-barrier-safe accessories.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

2.02 MANUFACTURERS AND PRODUCTS

A. Manufacturers:
   1. Fortifiber.
   2. Insulation Solutions.
   3. Stego.
   4. W.R. Meadows.

B. Products: Basis of Design: Stego “Stego Wrap Vapor Barrier”, 15-mil.

C. Subject to compliance with requirements, comparable products from the manufacturers listed accepted for review. Submit substitutions for manufacturers and products not listed, in accordance with Section 01 25 00, Substitutions and Product Options.

2.03 VAPOR RETARDER SHEETING

A. Below-Grade Vapor Retarder Sheeting: Polyolefin film manufactured with virgin resins, meeting or exceeding requirements of ASTM E1745, Class A, maintaining a permeance of less than 0.01 perms.

1. Thickness: 15 mil, minimum.

B. Performance Characteristics:
1. Water Vapor Permeance: Maximum 0.01 perms, tested per ASTM E154 for new and conditioned vapor retarder per Sections 8, 11, 12 and 13; or ASTM F1249.
2. Tensile Strength: Minimum 45 foot-pounds per inch, tested per ASTM E154 Section 9 (ASTM D882).
3. Puncture Resistance: Minimum 2200 grams, tested per ASTM D1709, Method B.
4. Impedes the transmission of methane gas and radon gas.

2.04 ACCESSORY MATERIALS

A. Seam Tape: "StegoTape" high density, polyethylene tape with pressure-sensitive adhesive as recommended by vapor retarder manufacturer.

B. Perimeter/Edge Seal: "Stego CreteClaw Tape", or "Stego Track Double-Sided Tape".

C. Miscellaneous Accessories: Seam splice tape primer, “Crete Claw”, termination bars, adhesives, mastic and other accessories as recommended by vapor retarder manufacturer for a complete installation and to maintain watertightness.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Verify that subgrade and base course work is complete, and free from conditions that may cause puncture, movement, settlement, and other damage to vapor retarder.
2. Verify that items which pass through vapor retarder are properly and rigidly installed.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Installation – General: Install vapor retarder in accordance with procedures outlined in ASTM E1643, vapor retarder manufacturer’s installation instructions, and provisions of the Contract Documents.

B. Place vapor retarder over prepared granular base course with the sheet width parallel to the direction of the pour of the concrete, in widest practical width, with a minimum number of joints, and laid smooth without folds or bunches of material.

C. Install continuous underslab vapor retarder with penetrations, transitions, and perimeters sealed as required to prevent unacceptable moisture vapor migration levels from diffusing through concrete slabs-on-grade into building spaces.
1. Lap joints minimum 6 inches unless otherwise recommended by vapor retarder manufacturer for conditions of installation. Face laps away from the expected direction of the placement whenever possible.
2. Seal lapped joints, boots, penetrations, patches and the like, with manufacturer’s recommended tape or mastic to suit conditions.
3. Roll tape to remove wrinkles and to make continuous contact with vapor retarder, and to achieve water vapor-tight performance.
4. Turn up edges at vertical surfaces not less than 6 inches.

5. Lap vapor retarder over footings, turn up to full slab thickness, and seal with pressure sensitive tape to foundation wall. No sheeting material shall be visible at completion of project.
6. Seal vapor retarder continuously around the perimeter/edges to vertical sides of footings or foundation walls with double-sided tape or termination bar or both.
7. Vapor retarder, boots and other shapes shall be clean and dry before sealing.

D. Repair: Patch and repair tears, punctures, and damaged areas in accordance with manufacturer's instructions.
1. Overlap tears and holes 6 inch beyond damaged area with patches.
2. Seal patch to installed sheeting with pressure sensitive tape, in accordance with manufacture's instructions, taping all four sides.
3. Do not patch or seam when vapor retarder is wet.

E. Place concrete directly over installed vapor retarder and insulation as indicated.
1. Do not install granular fill materials over vapor retarder.
2. Do not allow ground set stakes, screed posts or the like to puncture vapor retarder.

3.03 FIELD QUALITY CONTROL

A. Visually inspect vapor retarder sheeting to verify that the installation complies with manufacturer's instructions, has not been penetrated, and is free of tears, voids and holes. Repair damaged areas.
1. Inspect again immediately before pouring concrete.

3.04 PROTECTION

A. Protect from damage after cleaning area of debris.
1. Do not allow traffic on completed Work or, if required, lay insulation, then protection board over the installed vapor retarder at areas to receive temporary foot traffic.
2. Do not stack or store items or materials directly on vapor retarder.
3. Protect installed vapor retarder from construction loads and items that may puncture or damage the installation.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. 2-Ply Styrene-Butadiene-Styrene (SBS) modified bituminous membrane roofing system installed over roof cover board installed over an existing concrete roof deck.
2. Adhesives, flashing and sealing materials, and accessories as required for complete installation.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 05 50 00 - Metal Fabrications
3. Section 05 73 16 - Wire Rope Decorative Railings: coordinate steel bracket at roof /railing edge
4. Section 07 62 00 - Sheet Metal Flashing and Trim
5. Section 07 76 00 - Roof Pedestals and Pavers
6. Section 07 92 00 - Joint Sealants

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ANSI/SPRI ES-1	Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems
ASCE/SEI 7	Minimum Design Loads for Buildings and Other Structures
ASTM	Standards indicated herein
FM Global	
NRCA	NRCA Roofing and Waterproofing Manual
SMACNA	Architectural Sheet Metal Manual: Sheet Metal and Air-Conditioning Contractors National Association, Inc.
UL	Fire Hazard Classifications
IBC	International Building Code with City of Mercer Island amendments

B. Definitions: Roofing Terminology: See ASTM D1079 and glossary of NRCA Manual for definition of terms related to roofing work in this Section.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate with roof paver/pedestal system, cable railings, and adjacent construction including salvaged and reinstalled concrete.

B. Pre-Installation Meetings: Convene to review the following:
1. Methods and procedures related to roofing installation, including manufacturer's written instructions, and work which interfaces with or affects roofing.
2. Deck substrate conditions for compliance with roofing manufacturer’s requirements.
3. Structural loading limitations of roof deck during and after roofing.
4. Base flashings, special roofing details, roof drainage, roof penetrations, pedestal/pavers, and condition of other construction that will affect roofing system.
5. Governing regulations and insurance requirements as applicable.
6. Temporary protection requirements for roofing during and after installation.
7. Roof observation and repair procedures after roofing installation.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
   1. Product Data: For each product and material indicated.
   2. Manufacturer's installation instructions.
   3. Shop Drawings: For roofing system. Include the following:
      a. Sections, details, and adjacent construction.
      b. Drawing indicating system components from substrate to uppermost layer.
      c. Base flashings and membrane terminations.
      d. Pedestal/paver system, and perimeter railings.
   4. Manufacturer Certificates: Signed by roofing manufacturer certifying the following:
      a. Roofing system complies with requirements specified in "Performance" Article.
         1) Submit evidence of compliance with performance requirements.
   5. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation as required for warranty.
   6. Qualifications Data: For manufacturer and installer.
   7. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Maintenance manual for roofing system.
   2. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Shall be in continuous business manufacturing roofing of the type and quality specified, for a period as long as the warranty for the roofing system.
   1. Manufacturer's Field Services:
      a. Manufacturer's technical representative shall make periodic site inspections to confirm that the project is constructed as specified, by an experienced, full time employee of the company and is compliance with terms of the warranty.
      b. Report progress and quality of the work as observed.
      c. Report to the Owner and Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
      d. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

B. Installer Qualifications: Shall be accepted, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

C. Source Limitations: Obtain components for membrane roofing system from single membrane roofing manufacturer.

D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of membrane roofing system, that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver materials in original containers with unbroken seals, labels with product name, date of manufacture, approval or listing agency markings, and installation instructions.
   2. Store liquid materials in a clean, dry, protected location at temperature recommended

by roofing manufacturer, and protected from direct sunlight and temperatures above 90 deg F. Acclimate adhesives to 65 to 85 deg F temperature 24 hours before use.

3. Handle and store roofing materials and place equipment in a manner to avoid permanent deformation or damage to existing concrete deck.

1.07 PROJECT SITE CONDITIONS

A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed accordance with manufacturer's instructions and warranty requirements.
   1. Do not install when the chance of rain or snow is more than 30 percent.
   2. Cold Weather: Consult NRCA Guidelines for temperatures below 50 deg F.

B. Ensure the roof is weather and water tight at the end of each workday. Protect as required.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
   1. Specified Product Warranty: Manufacturer's 20-year NDL (without monetary limitation) warranty, agreeing to repair or replace components of membrane roofing system that fail in materials or workmanship within Warranty Period. Failures shall include roof leaks and warranty includes the following:
      a. Warranty includes, but is not limited to, cover boards, membrane roofing, flashings, and other components of membrane roofing system.
   2. Special Project Warranty: Installer’s 2-year Labor and Materials warranty agreeing to repair or replace components of membrane roofing system that fail in materials or workmanship listed above.
   3. Quality assurance review by roofing manufacturer is required prior to the installation of pedestal/paver system applied over completed roofing.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC, including Chapter 15.
   2. Membrane Roofing System: Shall be successfully tested to meet or exceed wind uplift resistance pressure of IBC, and ASCE-7, tested per FM 4474, UL 580, and UL 1897.
   3. Edge Metal Securement: Conform to IBC, and SPRI ES-1/FM 4435.

B. Performance/Design Criteria:
   1. General: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
      a. Design Loads: See Structural General Notes.
      b. Uplift Pressures: See Structural General Notes.
      c. Class 1A-90.
   2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
   3. Exterior Fire-Test Exposure: Class A per ASTM E108 or UL780; as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

2.02 SBS-MODIFIED BITUMINOUS MEMBRANE ROOFING

A. Manufacturers:
   1. Garland Co.
   2. Derbigum
   3. Soprema
   4. Or approved.

B. Product: Basis of Design: Garland system indicated.

C. SBS-Modified Bituminous Membrane Roofing Assembly:
   1. Roof Assembly: 2-ply roof membrane system installed over existing concrete deck (listed from bottom to top):
      a. Roof cover board adhered to existing concrete deck;
      b. Base Ply torch-applied to cover board;
      c. Top Ply torch-applied to base ply sheet.
   2. Total Thickness: 315 mils.

D. Base Sheet: Garland “HPR Torch Base Sheet”.
   1. Description: ASTM D6163, Type III, SBS-modified base ply/underlayment.
   2. Thickness: 120 mils.
   3. Materials: Membrane modified with SBS rubber, with a dual fiberglass scrim, and a burnable polypropylene backer.
   4. Properties:
      a. Tensile Strength: 210 lbf/in, in MD and MX, tested per ASTM D6147.
      b. Tear Strength: 300 lbf MD and XD, tested per ASTM D6147.
      c. Elongation: 6.0 percent MD and XD, tested per ASTM D6147.
      d. Low Temperature Flexibility: Pass, tested at -30 deg F per ASTM D5147.

E. Cap Sheet/Roofing Membrane: Garland “Stressply IV Plus Mineral”.
   1. Description: ASTM D6162, Type III Grade G, SBS-modified roofing membrane, coated with reflective mineral granules.
   2. Thickness: 195 mils.
   3. Roll Width: 3 feet 3 inches.
   4. Materials: Membrane modified with Styrene-Butadiene-Styrene (SBS) rubber, with a high-strength reinforced polyester/fiberglass scrim; and “Sunburst” mineral.
   5. Properties (Stressply IV Plus Mineral): Tested 2 minutes at 73.4 (+/- 3.6) deg F.
      a. Tensile Strength: 310 lbf/in, in Machine Direction (MD) and Cross-Machine Direction (CMD/XD), tested per ASTM D5147.
      b. Tear Strength: 510 lbf MD and CMD, tested per ASTM D5147.
      c. Elongation: 9.0 percent MD and 8.0 percent CMD, tested per ASTM D5147.
      d. Low Temperature Flexibility: Pass, tested at -40 deg F per ASTM D5147.
      e. Mineral Surface: Reflectance 0.45; Emittance 0.87; and SRI 51 per CRRC.

2.03 ROOF COVER BOARD

A. Roof Cover Board: Georgia Pacific (GP) “DensDeck Prime Eonic”.
   1. Description: ASTM C1177, gypsum-based, sheathing board with non-structural water-resistant core integrally bonded to fiberglass mat on both sides, pre-primed with factory-applied non-asphaltic primer on the panel surface.
   2. Thickness: Minimum 1/4 inch thick.

2.04 ACCESSORIES

A. Adhesives and Mastics: As recommended by roofing manufacturer, suitable to conditions.

1. Adhering Roof Board to Concrete: Garland “Insul-Lock HR Adhesive”, or as recommended by manufacturer.

B. Primer: As recommended by roofing system manufacturer for concrete substrate.

C. Roofing Penetrations (roof overflow drains): As recommended by roofing manufacturer.

D. Equipment: Propane tank with pressure gauge, roofing torch kit, trowels, rollers, heavy-weighted rollers, squeegees, seam probers, and as recommended by manufacturer.

E. Miscellaneous Accessories: As recommended by roofing system manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Verify that slope and condition of existing concrete decking meet manufacturer’s requirements.
2. Ensure that surfaces are dry, smooth, clean, and free of dust, dirt, oil, debris, dew and moisture that would adversely affect the installation of the roofing system.
3. Coordinate with the work of other trades required by installation of roofing.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Surfaces on which the roofing membrane system is to be applied shall be clean, smooth, dry, free of sharp edges, loose and foreign materials, oil and grease.
1. Do not install materials in conditions of inclement weather or outside manufacturer’s recommended temperatures. Do not begin if ice, snow, moisture or dew is present.
2. Do not apply roofing insulation or membrane to damp deck surface.

B. Concrete Substrates:
1. Fill substrate surface voids that are greater than 1/4 inch wide with an fill material acceptable to roofing manufacturer.
2. Prime prepared concrete surfaces for roofing with asphalt/concrete primer conforming to ASTM D41. Application rate per manufacturer. Allow primed areas to fully dry before proceeding with roofing application.

C. Protect adjoining surfaces against any damage that could result from roofing installation.

3.03 INSTALLATION - GENERAL

A. Installation – General: Install roofing membrane on clean and dry surfaces, in accordance with NRCA Manual, manufacturer’s instructions, and provisions of the Contract Documents.
1. Begin roofing in the presence of the manufacturer’s Technical Representative.
2. Perform roofing work on a continuous basis as surface and weather conditions allow.
3. Roofing installation shall be weather tight at completion of each work day. If weather conditions do not permit such completion, temporarily weatherproof exposed areas to prevent water infiltration from damaging other materials already installed.

B. Installation - Roof Cover Board:
1. Sweep or blow away dust, dirt or sand particles that may interfere with adhesion.

2. Lay cover board with long edges in continuous straight lines, perpendicular to roof slopes, with end joints staggered between rows. Tightly butt cover boards together.
3. Adhere single layer of cover board directly to the clean, dry concrete substrate, using specified adhesive applied in a ribbon pattern with thickness and spacing as recommended by manufacturer.
4. Immediately place board into the wet adhesive. Ensure positive contact between substrate and cover board and level uneven surfaces between boards. Do not allow adhesive to skin over.

C. Installation – Base Ply:
1. Begin at low point of roof. Unroll base ply membrane on cover board for alignment. Shingle in direction to shed water on each area of roofing. Allow sheets to relax.
2. Install base sheet flush to roof edge; extend up 8 inches at perimeter flashings.
3. Offset roll sidelaps 18 inches; provide 4 inch side laps and 8 inch end laps.
4. Extend base sheet tight up against vertical surfaces such as parapets or penetrations by 8 inches, unless otherwise indicated.
5. Using a roofing torch, heat surface of the coiled portion until burn-off backer melts away. Do not exceed manufacturer's temperature limits. Progressively unroll the sheet while heating, and press down in accordance with manufacturer's instructions, to ensure a proper bond.
   a. Repeat this operation with subsequent rolls.
6. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to ensure a tight seal, and to provide a smooth surface, free of air pockets, wrinkles, fishmouths or tears.

D. Installation – Top Ply/Cap Sheet:
1. Once the base ply installation is complete and does not show defects, install top ply.
2. Sweep or blow away dust, dirt or sand particles that may interfere with adhesion.
3. Relax roll until sheet lies flat.
4. Snap chalk lines and take care to ensure good alignment of the first roll.
5. Lay out sheets. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away and the material is hot enough to lay into the base sheet. Progressively unroll the sheet while heating, and press down in accordance with manufacturer's instructions, to ensure a proper bond.
6. After major portion of the roll is bonded, re-roll first 6 feet and bond in similar fashion. Repeat this operation with subsequent rolls with 4 inch side laps and 8 inch end laps.
7. Ensure the two membranes are perfectly welded, without air pockets, wrinkles, fishmouths or tears. Pass the torch along the lap joint and spread the melted bitumen evenly with a rounded trowel to ensure a smooth, tight seal.
8. Once the top ply membrane has a chance to bond, check laps and joints for full adhesion with a probing tool. Correct any defects. Where necessary, use hand-held welding gun to seal any small unbonded areas.

E. Installation - Flashings:
1. Install the Torch Base Ply sheet followed by the Cap Sheet at flashings, in accordance with manufacturer's installation instructions. Refer to drawings for perimeter and flashing conditions.
2. Prime horizontal surface recommended by manufacturer, and allow to dry.
3. Over the existing installed field cap, apply a 3 feet wide Torch Base Ply sheet extending minimum 6 inches onto the field of the roof.
4. Apply a 3 feet side Cap Ply sheet over the over the Base Ply flashing extending minimum 9 inches onto the field of the roof, being sure to cover the Base Ply.
5. Once the membranes have bonded, check laps and joints for full adhesion with probing tool. Correct defects. Where necessary, use hand-held heat welding gun to seal any small unbonded areas that exist.

6. Coordinate with adjacent construction including sheet metal flashings, steel brackets, and railings, and with pedestal/paver system.

3.04 FIELD QUALITY CONTROL

A. Arrange for attendance of roofing manufacturer’s technical representatives at site during installation of roofing system.

B. The Owner may engage a testing and inspection agency to perform field inspection and testing in addition to the manufacturer’s representative.
   1. Substrate examination and preparation;
   2. Installation of roofing assembly including flashings, and installation of overburden at beginning of installation and at periodic intervals.
   3. Flood Testing.
   4. Furnish Field Inspection Reports.

C. Inspection by Manufacturer:
   1. Provide field observations by manufacturer's Technical Representative at start-up and at intervals of approximately 30 percent, 60 percent and 90 percent completion. Provide a final inspection upon completion of the Work.
   2. Warranty shall be issued upon manufacturer's acceptance of the installation.
   3. Field observations shall be performed by manufacturer's Technical Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
   4. Provide observation reports from manufacturer's Technical Representative indicating procedures followed, weather conditions, and discrepancies found during inspection.
   5. Contractor shall repair or replace deteriorated or defective work found at time of inspection as required, to provide an installation free of damage and deterioration at time of Substantial Completion, that is in compliance with warranty requirements.
   6. Notify the Contractor, Owner and Architect upon completion of corrections.
   7. Following the final inspection, provide a final report from manufacturer's Technical Representative, certifying that roof system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

D. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
   1. Perform additional testing and inspecting, at no cost to Owner, to confirm compliance of replaced or additional work with specified requirements.

E. Overburden – Pedestal and Paver System:
   1. Prior to placement, examine roof area to be covered, to ensure membrane is free of damage, properly protected, and flashing has been properly installed.
   2. Protect installed roofing membrane at all times as installation of pedestal/paver system proceeds.

3.05 CLEANING

A. Leave installations clean and free from debris and residue resulting from this work.

B. In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Copper flashings and anchorage at reinstalled salvaged cast stone parapet caps.
2. Pre-painted Galvalume flashings and counterflashings at gap between buildings.
3. Custom powder-coated sheet chimney cap.
4. Miscellaneous flashing, sealants and accessories as required for a complete, watertight installation.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 02 41 19 - Selective Building Demolition: salvaged cast stone parapet caps
4. Section 04 01 20.91 Masonry Restoration
5. Section 05 01 99 - Restoration and Maintenance of Metals: exist. window headers
6. Section 05 50 00 - Metal Fabrications: custom steel bracket at edge of cable railing
7. Section 05 73 16 - Wire Rope Decorative Railings
8. Section 06 10 00 - Rough Carpentry: wood blocking
9. Section 07 52 16 - SBS-Modified Membrane Roofing
10. Section 07 92 00 - Joint Sealants

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
CDA	Copper in Architecture Handbook
FMG	Factory Mutual Global, Standards and Approvals
NRCA	NRCA Roofing Manual
Revere Copper Products	Copper and Common Sense
SMACNA	Architectural Sheet Metal Manual
SSPC	Volume 2: Systems and Specifications
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate flashings at roofing, roof deck, modified chimney, and other items affected by work of this Section, to maintain weathertight envelope.

B. Pre-Installation Meeting: Convene to review materials and techniques affecting work of this Section, mock-ups and sequence of related work specified in other sections.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 10, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Submit manufacturer's data for each product specified.
2. Shop Drawings: Illustrate all conditions. Where not specifically indicated in Contract Documents, use SMACNA system most nearly matching Project conditions. Include:
a. Material, thickness, weight, and finish for each item and location in Project.
b. Details for forming the work, including profiles, shapes, seams and dimensions.

c. Joining, supporting, and securing metal flashing and trim, including layout of fasteners, and other attachments. Include pattern of seams.
d. Termination points and assemblies, including fixed points.
e. Expansion conditions, showing direction of expansion and contraction.
f. Edge conditions, including counterflashings as applicable.
g. Details of special conditions and connections to adjoining work.

3. Samples: 6 inch or 12 inch square samples of each sheet material to be exposed as finished surfaces.
4. Qualifications Data: Fabricator/Installer and solderers.
5. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
1. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Shall be an experienced installer with a minimum 5 years of experience, including with historic restoration projects employing copper in similar applications and with similar performance requirements, and the following:
1. Soldering performed by solderers certified by CDA and or AWS/WABO for copper.

B. Sheet Metal Flashing and Trim Standards: Comply with SMACNA Manual, and CDA Handbook, unless more stringent requirements are specified or shown on Drawings.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Verify undamaged condition when accepted at site.
2. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation. Protect from damage at all times. Slope metal sheets to ensure drainage.

1.07 PROJECT SITE CONDITIONS

A. Field verify dimensions and indicate on Shop Drawings.

B. Environmental Limitations: Comply with product manufacturers' environmental limitations.
1. High-Temperature Self-Adhering Membrane: Store and apply at 40 deg F and rising.
2. Entire roof assembly shall be installed in dry weather conditions.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
1. Special Project Warranty: Installer’s 2-year Labor and Materials Warranty that work shall be waterproof and weathertight against ordinary wear and usage, and for resistance for damage from wind.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

B. Performance Requirements:
1. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather

without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

2. Uplift/Roof Edge Terminations: Fabricate and install in compliance with IBC, SPRI ES-1 and FM Approvals/FMG Loss Prevention Data Sheet 1-49.
   a. Design Loads/Pressures: As indicated on Structural General Notes.
3. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes without buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.
   a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 MATERIALS

A. General:
   1. Materials best quality, thickness not less than indicated.
   2. Sheet metal not otherwise called for shall be minimum gauges/referenced SMACNA Manual for comparable construction. Use heavier gages where required by conditions of installation.

B. Copper Sheet: ASTM B370 or ASTM B152, cold-rolled, HOO temper; minimum temper and alloy as required to suit forming operations and performance required.
   1. Weight: 16-oz./square foot weight or 0.0216 inch thick unless indicated otherwise.
      a. Minimum Weight: No less than weight of adjacent component; but no less than two gauges heavier, for hangers and brackets.
   2. Finish: Natural weathering mill finish. No applied finish.

C. Galvalume Sheet: Commercial-quality or structural quality steel sheet as required to suit forming operations and performance required.
   1. ASTM A755, zinc-coated (galvanized) by the hot-dip process, G90 coating per ASTM A653; or ASTM A792, Grade 40, hot-dipped aluminum-zinc alloy, AZ50 coating designation. “Galvalume” or “Zincalume”.
      a. Coating Weight: Minimum Z50 (0.50 oz./sq.ft.; 0.8 mil thickness per side).
   2. Finish: Powder coating. See “Finishes” Article 2.05 below.

2.03 AUXILIARY MATERIALS AND ACCESSORIES

A. Self-Adhering, High-Temperature Underlayment (at copper parapet cap): Self-adhering, high-temperature, flexible flashing membrane, 30 mils thick, with protective release liner, and proven compatibility with copper.
   1. Manufacturer/Product: GPC “Grace Ultra” or approved.

B. Reglets, Counterflashings, and Terminations:
   1. Custom fabrications in accordance with SMACNA; or as manufactured by Fry Reglet Corporation, Dayton/Richmond, Heckmann, or approved.
   2. Units of the type and profile indicated and as required by conditions of installation.
   3. Material/Finish: Material, types, and finishes as indicated.

C. Anchorage, Fasteners and the Like: Same metal as flashing/sheet metal unless indicated otherwise. Match finish of exposed heads with material being fastened.
   1. Copper: Copper or copper alloy fasteners, type as recommended by manufacturer for substrates and conditions of installation, including but not limited to:
      a. Pins: Copper, 1/2 inch diameter x 6 inch long for anchorage to concrete.
   2. Powder Coated Steel (chimney cap): Anchorage as indicated.
   3. Galvanized Steel: 18 gauge cleats, anchored as indicated on Drawings, for anchorage to concrete.

D. Solder: ASTM B32, best commercial quality, type best suited to material to be soldered.

E. Miscellaneous Accessories:
   1. Provide incidental and accessory items, methods, tools and equipment as indicated or required by conditions of installations, and complying with SMACNA. Copper unless accepted by Architect in writing.
   2. As recommended by material manufacturer and compatible with contacting materials, and as required for a complete installation.

F. Isolation Accessories: Isolation tape, pads, membranes or coatings as recommended by material manufacturer and compatible with contacting materials, as necessary to prevent galvanic action between dissimilar metals and dissimilar materials.

G. Sealant: Suitable to conditions. See Section 07 92 00, Joint Sealants.

2.04 FABRICATION

A. General: Conform to SMACNA and CDA. Review conditions with Architect and resolve prior to submittal of Shop Drawings. Conform to follow general requirements:
   1. Shop form sections to match existing where indicated, and form new as indicated on Drawings, true to shape, accurate in size, square, and free from distortion or defects.
   2. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view, unless specifically indicated on Drawings.
   3. Fabricate cleats, starter strips, attachment devices and the like of the same material as sheet, in widths required by SMACNA, interlockable with sheet.
   4. Form pieces in longest practical lengths.
   5. Provide expansion joints at minimum 40 foot intervals or as required by SMACNA.
   6. Hem exposed edges on underside 1/2-inch; fabricate drip edges per SMACNA.
   7. Solder and seal joints, corners and special conditions, unless indicated otherwise. After soldering, remove flux. Wipe and wash solder joints clean.
   8. Fabricate separate corners with minimum 24 inches long legs and soldered seams.
   9. Fabricate vertical faces and drip edges with bottom edge hemmed under as indicated.
   10. Cap neat ends as required or indicated.

B. Sheet Metal Flashings: Refer to Drawings for size/shape and profile; request clarification for information not indicated on Drawings, and for conflicts.
   1. Flashing and counterflashing at gap between buildings. Field-verify dimensions.
      a. Material: 24 gauge minimum coil-coated Galvalume sheet, unless thicker gauge recommended by SMACNA, is indicated, or is required by conditions.
   2. Cleats and Clips: One gauge size thicker than sheet metal, unless indicated otherwise.

C. Copper Flashing at Reinstalled Cast Stone Parapet Caps:
   1. Obtain field measurements for accurate fit before shop fabrication.
   2. Material: 16 ounce copper sheet.
   3. Fabricate flashings to sizes and configurations indicated, with hemmed edges.
   4. Hem exposed edges on underside 1/2-inch; fabricate drip edges per SMACNA.
   5. Coordinate with pins indicated, to anchor flashing to concrete wall prior to reinstallation of salvaged cast stone parapet caps.

D. Roof Chimney Cap:
   1. Obtain field measurements after top portion is removed, and before shop fabrication, for accurate fit of new custom chimney cap.
   2. Material: Minimum 14 gauge galvanized steel.
   3. Finish: Powder coated.

4. Fabricate 8-sided chimney cap to geometric configuration and sizes indicated, with hemmed edges, and interior reinforcement/supports.
5. Slope top surfaces 1 inch per foot to drain.
6. Reinforce as required to support chimney cap span.
7. Solder and seal joints, for weathertight chimney cap.

E. Miscellaneous: Fabricate as required.

F. Roof Perimeter at Cable Railings: See Section 05 50 00, Metal Fabrications, for custom fabricated steel bracket at outside edges of cable railings.

2.05 FINISHES

A. High-Performance Organic Fluoropolymer Finish (where coated" or "painted" indicated): Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 621 (galvanized steel sheet) except as modified:
1. Humidity Resistance: 1000 hours.
2. Salt-Spray Resistance: 1000 hours.
3. Color: As selected from full range of manufacturer's color options.

B. Powder-Coating: TIGER Drulac "Tiger-Shield" two-coat system, or approved.
1. Color: As selected from manufacturer's full range of color options.

C. No coating required for copper fabrications.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
1. Examine substrates and conditions to verify actual locations, dimensions and other conditions affecting performance of the Work.
2. Verify substrate is sound, dry, smooth, clean, sloped to drain, and secure.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. General:
1. Install in strict accordance with manufacturer's instructions and provisions of the Contract Documents. Follow SMACNA, and CDA, whether item indicated or not.
a. Where instructions are in conflict, use the most stringent standard.
2. Execute by skilled mechanics according to best methods known to trade.
3. Make Work weathertight. Water shall have positive drainage at copings and the like. Block ends of flashings at openings to prevent water migration.
4. Install to allow expansion and contraction using concealed fasteners and anchors.
5. General flashings, counterflashings, reglets, and the like:
a. Install to detail in accordance with SMACNA, and as required for watertight installations.
b. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
6. Line, mouldings, and edges to be sharp and true. Reinforce as required for stiffness.
7. Seams: Neatly form and finish joints and seams

a. Seams: Nonmoving flat-lock seams: Tin edges to be seamed, form seams, and solder. Rivet joints for additional strength where indicated.
8. Surfaces shall be free from waves and buckles.
9. Use concealed fastenings, unless indicated otherwise.
10. Protect bare copper from oils and greases, masonry compounds, metal fines and fasteners, and other construction materials that may stain or discolor copper surface.
11. Coordinate installation with work and requirements specified in other Sections.

B. Installation Tolerances: Shim and align sheet metal work within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Membrane Roofing: Install flashings and other work at roofing in accordance with roofing manufacturer's instructions, SMACNA, NRCA, and provisions of Contract Documents, and as required for watertight installations.
1. See also Section 07 52 16, SBS-Modified Membrane Roofing.

D. Sealants: As specified in Section 07 92 00, Joint Sealants. Install where indicated and where required to make weathertight.

E. Accessories: Furnish and install as indicated or as necessary. Items of same materials as items to which applied.

F. Electrolytic Protection: Provide permanent separation between contacting surfaces of dissimilar materials, to prevent electrolytic corrosion. Treat, or isolate surfaces with protective material, as recommended by manufacturer of the metals in contact.
1. Corrosion: Pay particular attention to protection/separation at copper flashings.
2. Do not permit water to drain from copper to zinc coated steel in particular.

3.03 CLEANING AND PROTECTION

A. On completion of installation, clean finished surfaces. Clean and neutralize flux materials; clean off excess solder. Clean off excess sealants.
1. Remove temporary protective coverings and strippable films as metal flashing and trim are installed unless otherwise indicated in manufacturer's installation instructions.

B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Adjustable pedestal system to support Ipe pedestrian traffic pavers over sloped substrate, at exterior roof deck.

B. Related Sections:
1. Section 07 52 16 - SBS-Modified Membrane Roofing
2. Section 07 92 00 - Joint Sealants

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
IBC	International Building Code

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate with metal railings and flashings at perimeter or roof.
2. Coordinate with roofing manufacturer to ensure compliance with roof warranty.

B. Pre-Installation Meetings: Convene to review substrates, conditions of installation including perimeter containment, and warranty requirements.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each product, including cleaning and maintenance instructions.
2. Manufacturer's installation instructions.
3. Shop Drawings: Plans and details of installation including adjacent construction. Include location of tiles, supporting pedestals and calculations of loads.
4. Samples: Two full size samples of paver tile in species indicated, and two pedestals.
5. Certificates: Installer's certification that installation complies with manufacturer's requirements.
6. Qualifications Data: For installer.
7. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
1. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Shall have a minimum of 3 years of experience installing adjustable paver and pedestal systems of the type and quality specified.

B. Mock-Ups (Field Samples): Install 16 square feet of pedestals and pavers in location selected by Architect, for evaluation of surface preparation, installation techniques and workmanship. Do not proceed with installation until receive approval from the Architect.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Store products with original labels intact, in an enclosed or covered area protected from the elements as site conditions allow, and comply with manufacturer's storage and handling recommendations and instructions.

1.07 PROJECT SITE CONDITIONS

A. Perimeter Containment: Decks shall be restrained on all sides, with no lateral movement in excess of one tab set (not to exceed 3/16 inch).

B. Where pedestal system will support features in addition to pavers, review conditions with pedestal manufacturer.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
1. Specified Product Warranty: Pedestal manufacturer's 5-year warranty against material and manufacturing defects. Material defects are defined as imperfections that impair the utility of the tile product.
2. Special Product Warranty: Installer's 5-year Labor and Materials warranty against defects in installation and workmanship.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

2.02 MANUFACTURERS AND PRODUCTS

A. Manufacturers:
1. BISON
2. Or approved.

B. Substitutions: Submit substitutions in accordance with Section 01 25 00, Substitutions and Product Options.

2.03 WOOD DECKING PAVER

A. Roof Deck Paver Tile: BISON "WT-IPE-24-RIBBED Ipe Wood Tile”.
1. Description: Commercial grade wood tiles naturally weather to a silvery-gray patina.
2. Species: Ipe, FSC-certified.
3. Paver Size: 23 7/8 inches x 23 7/8 inches x 1 5/8 inches thick.
4. Surface: Ribbed.
5. Physical Characteristics:
a. Janka Hardness: 3,680 pounds.
b. Weight: 24 pounds per tile (6 pounds per square foot).
c. Fire Rating: Class A, meets or exceeds ASTM E108.
6. End Sealing: Gorilla Glue, Elmers “PVA Wood Glue”, or sealer recommended by fabricator.

2.04 PEDESTAL SYSTEM

A. Roof Deck Pedestal System: BISON "Level It".
   1. Description: Set-to-screw, adjustable pedestals system that allows for deck slope, and is impervious to freeze-thaw cycles..
   2. Size: As required by conditions of installation.
   3. Material: High-density copolymer polypropylene.
   4. Cavity Height: Up to 12 inches.
   5. Maximum Load (bearing design capacity): 750 pounds per pedestal; Safety Factor: 2.

2.05 ACCESSORIES

A. Pedestal Base Pads: Bison "Model FIB", Mineral Filled High Density Copolymer Polypropylene, with galvanized steel base plate.
   1. Size: 12 inch x 12 inch x 11/16 inch base bearing surface.

B. Fasteners: Bison “FS-1 Fastening Kit”, washer and “Long Screw” fastens tiles to adjustable pedestals, and can be rotated to remove individual pavers after installation.

C. Accessories: Manufacturer's standard spacer tabs, shims, levelers, fastening kits, and the like, as required for a complete installation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Installations Over Roofing: Comply with recommendations and instructions of roofing manufacturer, and paver/pedestal manufacturer, as required for warranty compliance.
   1. Where in conflict, assume the most stringent requirement. Notify Architect of conflicts.

B. Substrates shall be clean and free of projections and debris that may impair performance of the pedestal system and or the installation.

3.03 INSTALLATION

A. Install pedestal system to support pavers, in accordance with manufacturer's instructions for conditions of installation.

B. Layout:
   1. Establish accurate lines, levels and pattern/tile orientation as indicated on Drawings prior to beginning installation.
   2. Installation shall allow for expansion.
   3. Perimeter Containment: Install perimeter framing and edging boards as required, to restrain movement at perimeter of system to maximum 3/16 inch.

C. Pedestal System Installation:
   1. Install pedestals in accordance with manufacturer's instructions.
   2. Install a 12 x 12 inch base pad and piece of installed roofing membrane be used as a separate protective slip sheet under each pedestal.

3. Locate pedestals; adjust the slope compensation on the pedestal to ensure a level paver installation as required for conditions and level with laser or other leveling device as required to maintain flat and level, ADA-compliant installation.
4. Do not exceed height limit of pedestals.
5. Shim and adjust pedestals to eliminate rocking, uneven, or un-level pavers.
6. Anchor as recommended by manufacturer to maintain secure, level installation.
   a. Do not use adhesives to install components at or near roofing membrane.

D. Paver Tile Installation:
1. Install paver tiles in accordance with manufacturer's instructions.
2. Cutting: Use carbide saw blades and a slower feed rate to cut tiles. Apply end sealer at coverage rate recommended by manufacturer. let thoroughly cure and dry.
3. Install paver tiles with consistent joints. Unless specified in writing by tile manufacturer to allow for expansion, ensure that spacing between tiles and at perimeter does not exceed 1/8 inch.
4. Secure tiles to pedestals, by inserting the FS-1 washer into the continuous kerf in the corner of three wood tiles, then inserting the fourth paver and turning to secure all four corners. Drive the screw through the center of the washer and into the center of the pedestal top. Do not overtighten.

E. Install joint sealant at perimeter where indicated.

3.04 FIELD (SITE) QUALITY CONTROL

A. Protect waterproofing membrane system from activities of the work of this Section, to prevent damage to waterproofing membrane.
1. Repair waterproofing membrane damaged by work of this Section; retest membrane per waterproofing manufacturer’s recommendations, at no cost to Owner.

B. Inspect construction progress regularly to ensure grid line spacing is being maintained in a straight and consistent manner and paver tiles are level and not rocking. Ensure that all spacer tabs are in place, visible and secure.

C. Pedestal and paver system manufacturer’s technical representative shall inspect the Work at intervals during installation as required to ensure pedestal and paver system warranty compliance.

3.05 CLEANING AND PROTECTION

A. Leave installation area clean and free of debris.

B. Protect completed pedestal and paver system from subsequent construction activities so roofing membrane is not damaged by other trades.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Joint sealants for exterior and interior joints in vertical and horizontal surfaces.
2. Backer rods and accessories as required for a complete installation.

B. Related Sections:
1. Section 04 01 20.91 Masonry Restoration
2. Section 05 01 99 - Restoration and Maintenance of Metals
3. Section 07 62 00 - Sheet Metal Flashing and Trim
4. Section 08 11 13 - Hollow Metal Doors and Frames
5. Section 08 33 26 - Overhead Coiling Counter Door

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
21 CFR 177.2600	Rubber Articles Intended for Repeated Use
40 CFR 59, Part 59, Subpart D	National Volatile Organic Compound Emission Standards for Architectural Coatings
IBC	International Building Code with City of Mercer Island amendments

B. Definition: Regardless of terminology used on Drawings, where "caulking" or "sealant" called for, use specified sealant continuously, entire area and assembly, except where weeps are called out at window sills, and the like.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene to review conditions of installation.

B. Sequencing and Scheduling:
1. Do not begin work of this Section before Preconstruction Compatibility and Adhesion Test Reports have been reviewed and accepted by the Owner and Architect.
2. Schedule applications of waterproofing, water repellents and preservative finishes after sealant installation unless sealant manufacturer approves otherwise in writing.
3. Ensure that installed sealant cures sufficiently prior to subsequent applications.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 10, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each joint-sealant product indicated.
2. Schedule of Sealant Joints: Identify locations, type of joints, adjacent materials, and proposed sealant for each type of joint. Indicate sealant type, grade, class, use, color, and manufacturer and product name.
3. Samples:
a. Samples for Initial Selection: Manufacturer's color charts for each product exposed to view.
b. Samples for Verification: Each type and color of sealant required for mock-ups.
4. Product Certificates: Manufacturer’s certification for each joint sealant and accessory.

5. Test Reports:
   a. Product Test Reports: Based on comprehensive testing of product formulations performed by qualified testing agency, indicating compliance with requirements.
   b. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing.
   c. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
      1) Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
      2) Written recommendations for required primers and substrate preparation.
   d. Field Test Report Log: For each elastomeric sealant application.
6. Qualifications Data: Installer.
7. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Warranty documentation.
   2. Record Documentation:

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Shall be a manufacturer's authorized installer who is approved or licensed for installation of elastomeric sealants required for this Project, and following:
   1. If requested, provide three projects of similar scope and complexity, including location and current phone contacts for Owner and Architect.

B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealants from a single manufacturer for each different product required to ensure compatibility.
   1. Manufacturer shall instruct applicator in procedures for intersecting sealants.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
   1. Use ASTM C1087 or manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
   2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
   3. Schedule sufficient time for testing and analyzing results to prevent delaying Work.
   4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

D. Product Testing: Obtain test results for "Product Test Reports" from ASTM C1021-qualified testing agency based on testing current sealant formulations within a 36-month period preceding Notice to Proceed with or commencement of the Work, whatever occurs latest.
   1. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.
   2. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
   3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

E. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test by qualified testing agency, testing adhesion to Project joint substrates as follows:
   1. Locate test joints where indicated; if not indicated, as directed by Architect.
   2. Conduct field tests for each type of sealant and joint substrate indicated.

3. Notify Architect 7 days in advance of dates and times when test joints will be erected.
4. Arrange for joint-sealant manufacturer's technical representative to be present at test.
   a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193.
   b. For joints with dissimilar substrates, verify adhesion to each substrate separately
5. Evaluate and report results of field adhesion testing.
6. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
7. Do not use joint preparation methods or sealants that produce less than satisfactory adhesion to joint substrates during testing.

F. Mock-Ups/Field Samples: Build mock-ups of sealant joints in mockups of assemblies specified in other Sections. Mock-ups shall demonstrate aesthetic effects and set quality standards for materials and execution.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver materials in original unopened containers labeled with manufacturer’s data.
   2. Store materials in clean, dry area at temperatures above 40 and below 86 deg F.
   3. Do not use sealants and primers after manufacturer’s stated shelf life.

1.07 PROJECT SITE CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer.
   4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
   1. Specified Product Warranty: Manufacturer's warranties against adhesive and cohesive failure of the sealant and against infiltration of water and air through sealed joints, agreeing to repair or replace those that do not comply with performance and other requirements specified in this Section.
      a. Warranty Periods:
         1) Silicones: 20-years from date of Substantial Completion.
   2. Special Project Warranty: Installer's 2-year Labor and Materials warranty to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section, including against adhesive and cohesive failure of the sealant and infiltration of water and air through the sealed joint.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC.

B. Performance Requirements:
   1. Joint sealants shall establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

2. Compatibility: Select joint sealants, backings, and related materials for compatibility with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

2.02 MATERIALS - GENERAL

A. General:
1. Provide joint sealants for applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.
2. Compatibility: Provide sealants, backings, and 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. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

C. Non-Elastomeric Sealants: Comply with ASTM C834 for type, grade, class, and uses.

D. Stain-Test-Response Characteristics: Use nonstaining sealants when in contact with porous substrates. Products shall have been tested according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

E. Colors of Exposed Joint Sealants: Approximate color of adjacent surfaces, as selected by Architect from manufacturer's full range.

2.03 ELASTOMERIC JOINT SEALANTS - SILICONE

A. Manufacturers:
1. Dow Corning Corp.
2. Momentive (GE-Silicones)
3. Pecora Corporation
4. Polymeric Systems, Inc.
5. Sika Corporation (formerly BASF)
6. Tremco Incorporated

B. Silicone Joint Sealants:
1. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, for Use NT.
2. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
3. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
4. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, for Use T.
5. Single-Component, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade P, Class 100/50, for Use T.
6. Single-Component, Mildew-Resistant, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.

2.04 JOINT-SEALANT BACKING

A. Backer Rod:
1. Provide sealant backings of material and type that are nonstaining; compatible with

joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2. Cylindrical Sealant Backings: ASTM C1330, closed-cell polyethylene foam rod or other flexible, permanent, durable non-absorbent material of size to control sealant depth. Oversize backer rod minimum 25 percent to 50 percent of opening.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.05 MISCELLANEOUS MATERIALS

A. Sanded Sealant Joints: Sand aggregate to match texture, color and appearance of adjacent substrates.

B. Primer/Sealer: Non-staining types 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.

C. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

E. Firestop Joint Sealants (flamesafe safing sealant): Elastomeric sealing material acceptable to AHJ shall resist passage of fire and toxic gases in non-fire-resistance rated assemblies.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Preconstruction Adhesion Testing: Apply sealant to small area and perform adhesion test in accordance with ASTM C1193, Method A, to determine if primer is required to achieve adequate adhesion.

B. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements.

1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), oil, grease, waterproofing, water repellents, water, surface dirt and asphalt-based materials.
2. Clean porous joint substrate surfaces such as concrete by brushing, grinding, blast cleaning, mechanical abrading, or a combination, to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
    a. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
    b. Remove laitance and form-release agents from concrete.

3. Clean 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. Nonporous joint substrates include metal and glass.
4. Verify that new sealant joints *will not be in contact* with any asphalt-based products.

C. Joint Priming: Prime or seal joint substrates, where recommended by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

D. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning. Remove immediately without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

A. Installation – General: Comply with ASTM C1193, and sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
1. Apply sealants before other coatings are applied to adjacent surfaces, or are applied to substrate, to ensure sealant adhesion.

B. Install sealants using proven techniques and at the same time backings are installed.
1. Install sealant backings of type indicated to support sealants during application and at proper depth of position required to achieve required joint width/depth ratio that allow optimum sealant movement capability, and to align to adjacent work.
   a. Provide backing materials in as long lengths as practicable. Do not leave gaps between ends of sealant backings.
   b. Do not stretch, twist, puncture, or tear sealant backings.
   c. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
2. Install bond-breaker tape as required to avoid 3-sided bond of sealant to substrate, and where sealant backings are not used between sealants and back of joints.
3. Place sealants so they directly contact and fully wet joint substrates.
4. Apply in continuous operation. Ensure sealant firmly contacts all surfaces and completely fill recesses in each joint configuration.
5. Produce uniform, cross-sectional shapes and depths relative to joint widths recommended by sealant manufacturer allowing optimum sealant movement capability. General measurements at center of bead:
   a. Horizontal Joints: 75 percent width, with minimum depth of 3/8 inch.
   b. Elastomeric Joints: 50 percent width, with minimum depth of 3/8 inch.
   c. Non-Elastomeric Joints: 75 percent to 125 percent of joint width.
6. Complete horizontal joints prior to vertical joints, without trapping moisture or dirt.
7. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   a. Remove excess sealant from surfaces adjacent to joints.
   b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   c. Provide concave joint tooled slightly below adjacent surfaces, per configuration per Figure 8A in ASTM C1193, unless otherwise indicated.
   d. Provide flush joint configuration where indicated per Figure 8B in ASTM C1193.
   e. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C1193.

3.04 CURING

A. Curing: Prior to painting or coating, allow sealant joints to cure as directed by sealant manufacturer, minimum 7 days for a single component, and 3 days for a multi-component. Allow sealant to fully cure before adhesive is stressed. Use test specimens formed at time of sealant application to verify curing time.
   1. Environmental Conditions: Ambient temperatures and humidity affect the cure rate and time required for joint to be “tack-free”. Notify Owner if cure times exceed the minimums listed.

3.05 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
   1. Extent of Testing: Test completed and cured joints as follows:
      a. Perform 10 tests for the first 1,000 ft. of joint length for each type of elastomeric sealant and joint substrate.
      b. Perform 1 test for each 1,000 ft. of joint length thereafter or 1 test per each floor per elevation.
   2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
      a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
   3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
   4. Inspect tested joints and report on the following:
      a. Whether sealants filled joint cavities and are free of voids.
      b. Whether sealant dimensions and configurations comply with requirements.
      c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
   5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
   6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory.
   1. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.06 CLEANING AND PROTECTION

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

B. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion.

1. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.07 SCHEDULE

JOINT SEALANT	APPLICATION
Single-Component Neutral- and Basic-Curing Silicone Sealant	• Exterior vertical and horizontal non-traffic joints in cast-in-place concrete • Exterior vertical control and expansion joints in unit masonry • Exterior horizontal pressure-relieving joints in unit masonry • Exterior joints between flashing materials and unit masonry • Exterior perimeter joints at frames of doors, windows and louvers • Exterior control and expansion joints in ceilings and other overhead surfaces • Exterior vertical joints between different materials listed above • All other exterior vertical and horizontal non-traffic joints unless noted otherwise
Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant	• Exterior joints with galvanized steel or insulated glass substrates
Single-Component Mildew-Resistant Acid-Curing Silicone Sealant	• Interior joints between plumbing fixtures and adjoining walls, floors, and counters • Joints between counters and adjoining walls and floors at bathrooms, kitchens and other wet areas
Latex Sealant	• Perimeter joints between interior wall surfaces and frames of interior doors and windows

END OF SECTION

DIVISION 08
OPENINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Exterior steel (hollow metal) doors and door frames as indicated.
2. Frame relationship to walls as indicated on Drawings.

B. Related Sections:
1. Section 07 92 00 - Joint Sealants
2. Section 09 96 00 - High-Performance Coatings

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ANSI/DHI A115 Series	Specifications for Steel Door and Frame Preparation for Hardware
ANSI/SDI A250 Series	Test Procedures, Acceptance Criteria, Specifications and Instructions for Steel Doors and Frames
ASTM	Standards indicated herein
NAAMM	Hollow Metal Manual and HHMA 800-850 Series Documents
SDI 112	Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames
SDI 117	Manufacturing Tolerances Standard Steel Doors and Frames
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate Work with other sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, and recessed items.
2. Coordinate with frame opening construction and anchorage installation.
3. Coordinate with Owner’s central access monitoring system wiring and devices.

B. Scheduling: Sequence installation to accommodate required door hardware.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Show elevations, dimensions, material, and gauges of metal, hardware reinforcing, and anchors for each door and frame specified. Include manufacturer’s data for fabrication and installation instructions.
2. Shop Drawings. Indicate for each frame type and door type:
a. Location/plans, elevations, and dimensions.
b. Acoustical and thermal ratings.
c. Details of construction, joints, connections, anchorage and accessory items.
d. Conditions at openings:
1) Floor/threshold and clearance at door bottom to clear flooring material.
2) Jambs and head to indicate frames flush with adjacent surfaces.
e. Location and installation requirements of finish hardware and reinforcements.
3. Schedule of Doors and Frames: Use the same reference numbers as Drawings.

4. Certificates of Compliance: Submit certification from manufacturer stating that hollow metal doors and frames delivered to project comply with these Specifications.
5. Test Reports: Submit test reports performed by a qualified testing agency, for each type of hollow metal door and frame assembly.
6. Qualifications Data: For manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Shall have a minimum of 10 years manufacturing products of the type and quality of hollow metal doors and frames specified, and be a member of SDI.
   1. Manufacturer may be a member of HMMA if accepted by the Owner.

B. Provide Hollow Metal Doors and Frames complying with with ANSI A250 Series and ANSI A115, NAAMM (HHMA where accepted by Owner).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Ship door frames with temporary spreader bar; replace with a setting spreader for frame installation.
   2. Jobsite Storage: Comply with ANSI A250.8. Store in protected area, elevated on wood sills in upright position, with 1/4 inch between individual units. Avoid cover materials that create a humidity chamber. Remove wet coverings immediately.
   3. Protect at all times to prevent rust and damage to doors, frames, and finish.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC, including Chapters 7 and 11.
   2. Comply with requirements of Washington State Energy Code, Non-Residential.

B. Performance/Design Criteria:
   1. Performance: Extra Heavy-Duty; Physical Endurance Performance, Level A, tested in accordance with SDI A250.4.
      a. Cycle Test: Tested to 1,000,000 cycles.
      b. Twist Test: 1.25 maximum deflection; and 0.125 inch maximum permanent deflection under 300 pound load.

2.02 MANUFACTURERS AND PRODUCTS

A. Manufacturers:
   1. Curries.
   2. Steelcraft.
   3. Stiles.
   4. Windsor Republic.
   5. Or accepted.

B. Products: Basis of Design: Curries specified herein for type, performance and quality.
   1. Doors: Curries “777 Trio" or "777 Trio-E” hollow metal doors.
   2. Frames: Curries standard hollow metal frames.
   3. Submit for review, corresponding products by manufacturers listed, in compliance with Section 01 25 00, Substitutions and Product Options. Include:
      a. Complete product information, details and performance data comparing proposed substitutions with products specified.

4. Note that steel-stiffened doors in lieu of the internal construction specified is not permitted. Knock-down frames not accepted.

2.03 HOLLOW METAL DOORS AND FRAMES

A. Hollow Metal Doors and Frames - General: Non-fire-rated steel (hollow metal) doors and frames.
   1. Types and sizes as indicated on Drawings.
   2. Steel stiffened where indicated, but note that steel-stiffened doors in lieu of the internal construction specified is not permitted. Knock-down frames not accepted.

B. Materials: Steel:
   1. Cold-Rolled Steel Sheet (exposed): ASTM A1008, Commercial Steel (CS), Type B.
   2. Hot-Rolled Steel Sheet (reinforcements and components not exposed to view): ASTM A1011, CS, Type B; free of scale, pitting, or surface defects; pickled and oiled.
   3. Galvanized/Gavannealed Sheet Steel: ASTM A653/A924; minimum A60 or G60 zinc coating. Minimum thicknesses indicated are base metal without coatings, per SDI A250.8
      a. Wipe Coat Galvanized Steel (WCGS) coating and ASTM A591 systems not accepted.

2.04 ACCESSORIES

A. Frame Anchors: Types as indicated, or if not indicated, as suitable to requirements.
   1. Stud-Wall Type Jamb Anchor: Designed to engage stud, factory-welded to the back of frames, not less than 18 gauge (0.042 inch) thickness.
   2. Expansion Type Jamb Anchor (concrete): Minimum 3/8-inch-diameter bolts with expansion shields or inserts, and a spacer within the jamb profile.
   3. Floor and Base Anchors: Formed from same material as frames, but no less than 18 gauge (0.042 inch) sheet steel. Weld floor anchors to bottoms of jambs.
   4. Hot-dip galvanized according to ASTM A153 anchors built into exterior walls.
   5. Anchor types and spacings in accordance with SDI standards to suit conditions.

B. Inserts, Bolts, and Fasteners: Manufacturer's standard, fabricated from corrosion-resistant materials compatible with material specified for doors and frames, of type suitable for substrate and application indicated

C. Door Silencers: Three on strike jambs of single-door frames and two on heads of double-door frames, except weather-stripped doors and frames.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15 mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

E. Miscellaneous Accessories: Provide door accessories as indicated. For weatherstripping, door stops, thresholds, and the like, refer to Door Hardware indicated on Drawings..

2.05 FABRICATION

A. General:
   1. Fabricate units to be rigid, neat in appearance, free from defects, warp or buckle.
   2. Wherever practicable, fit and assemble units in manufacturer's plant. Ship frame assemblies to the jobsite completely welded. Field splice only at approved locations.
   3. Fabricate exposed faces of doors and frames from cold rolled or galvannealed steel.
   4. Provide galvanized/galvannealed components and reinforcements at galvanized/galvannealed doors and frames.

5. Fabricate concealed components and reinforcements for interior doors and frames, from either cold-rolled or hot-rolled steel (manufacturer's option).
6. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible.
7. Fabricate to allow clearances for flooring as required by referenced standards.
8. Fabrication Tolerances: Comply with SDI 117.
9. Coordinate door hardware requirements.

B. Steel Doors:
1. General: Provide metal doors of types, styles and sizes indicated on Drawings.
   a. Door Thickness: 1 3/4 inch thick.
   b. Door Edge Construction: Continuously welded with no visible seam. Reinforce tops and bottoms of doors with continuous steel channel not less than 16 gauge (0.053 inch), extending the full width of door and welded to face sheet. Doors with inverted top channel shall have a steel closure channel welded in place so the channel web is flush with top of face sheets of door. Plastic fillers NOT accepted.
2. Exterior Doors:
   a. Flush Panel Type, Physical Endurance Level A (Extra Heavy Duty), and Model 2, Seamless.
   b. Material/Thickness: Level 3: 14 gauge (0.067 inch) minimum thickness for face sheets, ASTM A653/A924, galvannealed steel, minimum Grade A60.
   c. Core: Foamed-in-place polyurethane foam containing no added urea-formaldehyde; or other insulated core meeting Energy Code.
   d. Seal joints in top edges of exterior doors against water penetration.
   e. Special Bottom Edge Closure: Accommodate weatherstripping, and provide weep openings.

C. Steel Frames:
1. General: Provide frames for doors of the types, styles and sizes indicated on Drawings, complying with ANSI A250.8 for materials and construction requirements.
   a. Frame Face Width: 2 inches wide.
   b. Standard double-rabbet jambs with 5/8 inch return.
   c. Single-sided and double-sided flush jambs (face of jamb flush with adjacent material.)
   d. Match width of wall in which door is to be installed, and conceal fastenings, unless otherwise indicated.
2. Fully welded construction; machine-miter corners. Knock-down frames not accepted.
3. Exterior Frames: 14 gauge (0.067 inch) galvannealed steel, Grade A60.
4. Exposed Fasteners: Countersunk flat or oval-heads for exposed screws and bolts.

D. Provide steel reinforcement at hinges, latches, closers and similar areas of high stress, minimum gauges as follows:
1. Hinge reinforcement: 7 gauge (0.167 inch) plate with additional high frequency 10 gauge hinge reinforcement welded to the top hinge.
2. Lock strike reinforcing: 10 gauge (0.123 inch).
3. Closer and other surface-applied reinforcing: 10 gauge (0.123 inch).

E. Anchors:
1. Expansion Type Jamb Anchor (concrete): Minimum 3/8-inch-diameter bolts with expansion shields or inserts, and a spacer within the jamb profile.
2. Floor and Base Anchors: Formed from same material as frames, but no less than 18 gauge (0.042 inch) sheet steel. Weld floor anchors to bottoms of jambs.
3. Hot-dip galvanized according to ASTM A153 anchors built into exterior walls.

2.06 PROVISIONS FOR HARDWARE

A. General: Comply with applicable requirements of ANSI A115, SDI A250.6, BHMA

A156.115, and the following, for finish hardware. Where these may be in conflict, the more stringent requirements govern.

1. Mortise, reinforce and tap frames at factory for mortise hardware.
2. Work to templates for hardware.
3. Reinforce for surface-applied hardware.
4. Drill stops for rubber door silencers.
   a. Single-Leaf Doors: Three each lock jamb frame.
5. Provide plaster guards at silencers and strike pockets.
6. Conform to standards of hardware manufacturer except as modified this Section.
7. Locate finish hardware as indicated on Drawings.

B. Wiring and Devices: Provide electrical boxes, wireway and integrate devices at door and frames as required for Owner's monitoring systems specified in other Sections.

2.07 FINISHES

A. Finishes - General:
   1. Thoroughly clean and chemically treat surfaces for maximum primer adhesion, in accordance with SDI A250.10.
   2. Shop-applied primers shall be fully cured prior to shipment.
   3. Do not prime or paint over UL labels.

B. Shop-Applied Primer: Primer as specified in Section 09 96 00, High-Performance Coatings.

C. Field-Applied Finish Coats: As specified in Section 09 96 00.
   1. Natural or synthetic oil-based paint systems are recommended by door manufacturer.
   2. When used, water-based coating systems such as Latex and Acrylic require field application of primer and finish coatings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Inspect substrate and conditions under which doors and frames are to be installed. Verify:
   1. Frame dimension, and embedded and built-in anchors.
   2. Hardware.
   3. Clearance requirements for flooring material or threshold.

B. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Install the work in accordance with manufacturer's instructions, and provisions of the Contract Documents.

B. Installation - General:
   1. Regardless of tolerances specified or required for individual components forming portions of working assemblies, be responsible for final fitting and adjustments to individual components to provide a complete workable and usable assembly.
   2. If components forming an assembly do not function properly to provide a complete usable system, provide corrective measures.
   3. Door shall clear floor for full swing.
   4. Galvanic Protection: Coat or otherwise isolate to prohibit galvanic action.

C. Frame Installation:
   1. Place frames per ANSI A250.11.
   2. Install labeled and fire-rated frames in accordance with NFPA 80.
   3. Set frames accurately in place; square, plumb, aligned, and securely braced until permanent anchors are set.
   4. Provide insulation fill at exterior and acoustically sealed exterior door frames.
   5. Installation Tolerances: ANSI DHI A115.IG.
      a. Frame Opening Width: +1/16 inch;
      b. Squareness and Plumbness: Maximum 1/16 inch;
      c. Twist: +/- 1/16 inch measured at opposite face corners of jambs on parallel lines perpendicular to the plane of the door rabbet.
   6. Install anchor types suitable to conditions, and secure to adjacent construction using fastener type suited to application.

D. Door Installation: Fit doors accurately in their respective frames, within clearances specified in ANSI A250.8
   1. Installation Clearances:
      a. Between Doors and Frames at Heads and Jambs: Maximum 1/8 inch.
      b. Between Door Face and Stop: Maximum 1/8 inch.
      c. Between Door and Sill:
         1) At Doors (no thresholds): Maximum 3/4 inch, except 1/4 inch above carpeting.
         2) At Doors (with thresholds): Maximum 3/8 inch.

E. Finish Hardware:
   1. Finish hardware is specified on the Drawings. Field tap and drill for installation of surface applied hardware not applicable for factory installation.
   2. Door Silencers: Install silencers at interior doors. Do not install silencers in fire-rated frames or where silencer would interfere with gaskets or weatherstripping.

F. Sealant: Install sealant between door frames and wall; see Section 07 92 00 Joint Sealants.

3.03 ADJUSTMENT AND CLEANING

A. Inspect and repair frames and doors, conforming to SDI 122, and provisions of Contract Documents. Do not use metallic filler to conceal manufacturing defects. Replace units when repair is unsatisfactory or impractical.

B. Sand abraded, scarred and rusty areas smooth, and clean as recommended by manufacturer. Touch up with paint used for shop-applied primer in Section 09 96 00.

C. Adjust moving parts for smooth, quiet operation of door and hardware. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper condition.

D. Thoroughly clean surfaces, and clean up after installation.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Manual, overhead coiling counter doors with uninsulated, stainless steel slats.
2. Include hardware, accessories and as required for complete installation.

B. Related Sections:
1. Section 05 50 00 - Metal Fabrications
2. Section 12 36 13 - Concrete Countertops

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

Accessible Design	2010 Standards for Accessible Design (ADA)
ASTM	Standards indicated herein
DASMA 102	Specifications for Sectional Doors
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate coiling doors with adjacent construction including countertop.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer's product data and installation instructions. Include both published data and specific data prepared for this project.
2. Shop Drawings:
a. Include plans, elevations, dimensions, required clearances, anchorage, materials and accessories, and adjacent construction.
b. Include summary of forces and loads on walls and jambs.
3. Samples: Of each type of exposed finish, of same thickness and material indicated.
4. Certifications: Manufacturer's certification of compliance with specifications.
5. Qualifications Data: For manufacturer and installer.
6. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
1. Warranty Documentation.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Shall be an ISO 9002 registered company, and have a minimum of 5 years of experience in manufacturing doors of the type specified.

B. Installer Qualifications: Shall be an authorized representative of the door manufacturer for both installation and maintenance of units required for this Project.

C. Source Limitations: Obtain doors, tracks, and accessories through one source from a single manufacturer. Provide secondary components from source acceptable to manufacturer of primary components.

D. Overhead coiling/rolling doors shall conform to requirements of DASMA 102.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.07 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
1. Specified Product Warranty: Manufacturer's standard 2-year warranty against defects in material and workmanship.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC, including seismic.
2. Manual-operated doors shall require maximum 5 pound effort to lift.

2.02 MANUFACTURERS

A. Manufacturers:
1. Clopay
2. Cornell Iron Works (Cornell)
3. Overhead Door Corp.
4. The Cookson Co.
5. Wayne Dalton Corp.

B. Product: Basis of Design: Cornell products as indicated.
1. Substitutions: Subject to compliance with requirements, comparable products from manufacturers listed accepted for review. Submit substitution requests in accordance with Section 01 25 00 Substitutions and Product Options.

2.03 COILING COUNTER DOORS

A. Coiling Counter Doors: Cornell "Model ESC-10".
1. Description: Uninsulated manual overhead coiling door with guides, counterbalance, hardware and accessories required for complete installation. Door shall be easily stopped in any position and remain in position until movement is reactivated.
2. Sizes: As indicated on Drawings.
3. Operation: Push-up, manual lift.
4. Mounting: "Face of Wall", face-mounted to concrete beam.
5. Material/Finish: Stainless steel, Type 304, No. 2 Satin finish.

B. Curtain:
1. Slats: No. 1F, interlocked flat-faced slats, 1-1/2 inches high by 1/2 inch deep, minimum 22 gauge stainless steel with stainless steel angle bottom bar with lift handles.

2. Endlocks: Each end of alternate slats fitted with high-strength molded nylon endlock to act as a wearing surface and to maintain slat alignment.
3. Astragal: Furnish bottom bar with vinyl astragal to protect counter top finish.

C. Guides: 12 gauge stainless steel, formed shapes.

D. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inch per foot of width.
2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 pound; and wheel for applying and adjusting spring torque.

E. Bracket Plates: Steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures; finish as selected by Architect.

F. Hood: Minimum 24 gauge stainless steel with reinforced top and bottom edges, and intermediate support brackets.

G. Lock: Best masterkeyable cylinder operate from inside bottom bar; coordinate with Owner.

2.04 FABRICATION

A. Fabricate doors of continuous length for width of door without splices.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions for conditions of installation.

B. Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports.
1. Anchor to adjacent construction without distortion or stress.
2. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
3. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.
4. Position head and jamb weatherstripping to contact door sections when closed; secure in position.
5. Make wiring connections between power supply and operator and between operator and controls.

3.03 ADJUSTING

A. Following completion of installation, lubricate, test and adjust doors for ease of operation, free from warp, twist, or distortion.

END OF SECTION

DIVISION 09
FINISHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Provide shop-applied and field-applied painting and finishing of interior surfaces.
a. All surfaces to be painted or stained unless otherwise indicated.
2. Include preparation of surfaces.
3. The terms “paint” and “coat” are used interchangeably throughout the Project Manual for a painted finish and do not imply whether finish is shop or field applied.
4. Finish for factory primed items. See individual Sections for factory priming.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 05 12 00 - Structural Steel: steel stair stringers, angles, columns and beans
3. Section 07 92 00 - Joint Sealants
4. Section 09 96 00 - High Performance Coatings: coatings for concrete and CMU

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ANSI Z535.1	Safety Color Code
ASTM	Standards indicated herein
MPI	Master Painters Institute Architectural Painting Specification Manual
SSPC	Volume 1, Good Painting Practice, and Volume 2, Systems and Specifications Editions current as of date of Project Manual
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meetings: Review conditions of installation and items to be coated.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer’s product data sheets for each material specified including preparation and application instructions
2. Samples:
a. Architect will submit color chips to Contractor to match in a timely manner.
b. Brushout Samples: Before commencing work, prepare samples of selected colors on actual substrate, painted with specified coating in colors and glosses specified, for review and acceptance by Architect. Minimum size 8 x 10 inches.
c. For samples not accepted, furnish additional brush-out samples as required until accepted, and Architect issues written authorization to proceed.
d. When accepted, samples shall become standard of quality for appropriate on-site coatings. Retain one of each accepted sample on-site for reference.
3. Certification: Manufacturer’s certification that products meet VOC limitations, are “best quality” suitable to conditions, and meet requirements specified.
4. Qualifications Data: For manufacturer and applicator.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Record Documents: Provide a written list of paint manufacturer, product name, color, number, sheen, the area in which the paint was used and the specific location (e.g. general walls, doorframes, restrooms) for each actual coating used on Project.
   2. Maintenance Materials: Deliver to Owner 1 gal. of each color and type of finish coating used on Project, in containers, properly labeled and sealed.

1.05 QUALITY ASSURANCE

A. Qualifications of Manufacturers and Materials: Except as otherwise scheduled, use only specified and accepted products. Do not substitute without Owner's written acceptance in conformance with Section 01 25 00, Substitutions and Product Options.

B. Applicator/Painting Subcontractor Qualifications: Shall have a minimum of 5 years proven satisfactory experience of comparable magnitude and complexity to work of this project.
   1. If requested, provide contact information for the last three jobs including the Owner, Architect, completion date and amount of subcontract cost.

C. Source Limitations: Obtain primary coating systems from one manufacturer; use thinners and cleaning products recommended by the primary coating manufacturer.

D. Perform adhesion testing of metallic substrates in according to ASTM D3359, Method A.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver in unopened containers, bearing manufacturer's original labels, including date of manufacturer. Products not bearing original label will be rejected.
   2. Store and mix material outside building. Store per manufacturer's recommendations.
   3. Safety: Take precautions to prevent fire hazards and spontaneous combustion; conform to manufacturer's recommendations and applicable regulatory requirements.
   4. Store as required by governing Codes and ordinances.

1.07 PROJECT SITE CONDITIONS

A. Environmental Requirements:
   1. Perform painting work of this Section when surface temperature and ambient air temperatures are between 50 deg F, and 90 deg F.
   2. Perform no painting work in rain, fog or mist; or when the relative humidity is above 85 percent. Do not apply paint to damp or wet surfaces.
   3. Painting may be performed during inclement weather if areas to be painted are enclosed and heated and maintained within temperature limits indicated.

B. Ventilation: Verify adequate continuous ventilation as recommended/required by coating manufacturer; and provide temporary ventilation to remove VOC emissions of interior paint.

C. Illumination: Verify required lighting level minimum 15 footcandles per square foot, unless more stringent levels required by governing Codes and ordinances.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC, including Chapter 8, flame spread ratings for finishes.

2. Comply with requirements of Authorities Having Jurisdiction (AHJ), including Federal, State, and local requirements for VOC, pollution, safety, health and the like.
3. Comply with WISHA provisions for color marking physical hazards and safety, firefighting, and protective equipment. Colors shall meet ANSI Z535-1 tests.
4. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local AHJ.

2.02 MANUFACTURERS

A. Manufacturers: Except as noted below and subject to compliance with requirements, provide the products specified, and if no product is specified, provide products listed in Master Painters Institute (MPI) Accepted Product List resulting in “Premium Grade”.
   1. Products/Systems by Benjamin Moore, Sherwin-Williams, and Tnemec accepted.
   2. Other manufacturers indicated and listed in the MPI Manual may submit substitution requests in conformance with Section 01 25 00, Substitutions and Product Options.
      a. Include manufacturer's material data and certificates of performance with substitution request indicating clear comparison of products.

B. Proprietary Names: Where indicated, use of manufacturer's proprietary product names is not intended to imply that products named are required to be used to the exclusion of equal products of other manufacturers.

C. Miscellaneous: Consult MPI Manual for surfaces not scheduled and follow manufacturer’s instructions.

2.03 MATERIALS

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

C. Colors: As scheduled and to match accepted brush-out samples.

D. Gloss: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:
   1. Flat or matte: 0 to 5 units at 60 deg to a maximum of 10 units at 85 deg.
   2. Eggshell, velvet or low luster: 5 to 25 units at 60 deg - minimum of 10 units at 85 deg.
   3. Satin: 20 – 35 units at 60 deg.
   4. Semi-gloss: 35 – 60 units at 60 deg.
   5. Gloss: 65 units and greater.
   6. High Gloss: More than 65 units.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.
   1. Verify required lighting, temporary heat (if required by manufacturer) and ventilation.
   2. Conduct adhesion testing of metallic surfaces as indicated in Paragraph 1.05 D.

3.02 SURFACES TO BE FINISHED

A. Finish/paint surfaces visible in the final construction, including but not limited to equipment, trims, light fixture trim rings, covers, grilles, and the like, including those factory-finished.

B. Exposed Surfaces: Include areas visible when permanent or built-in fixtures, grilles, convector covers and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
   1. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   2. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

3.03 SURFACES NOT TO BE FINISHED

A. Do not finish the following surfaces, unless otherwise noted:
   1. Metals as Listed: Brass, bronze, copper, plated metals, stainless steel, and galvanized steel indicated to be final finish.
   2. Glass, unless otherwise noted.
   3. Materials having complete factory finish, such as electrical switchplates, lighting fixtures, finish hardware, and the like.
   4. Devices or labels not permitted to be painted by code or manufacturer.
   5. Other surfaces called out not to receive finishes specified in other Sections.

3.04 OTHER TRADES

A. Unless otherwise indicated, following surfaces are responsibility of other trades.
   1. Shop prime coats of metal fabrications, miscellaneous metals, sheet metal, and other shop prime coated metal items, except for minimal spot touch-up surfaces abraded during installation.
   2. Substrates, adversely affecting finish work, except minimal work normally performed by this trade.

3.05 PREPARATION

A. Prepare surfaces in accordance with paint manufacturer, MPI Manual, and as indicated. Where these requirements are in conflict, conform to most stringent. Consult MPI Manual and SSPC for surface preparations not indicated.
   1. Mildew removal: Scrub with a cleaning/bleaching solution, then rinse with potable water; let thoroughly dry.
   2. Steel and Iron: Prepare in accordance with SSPC SP-3, Power Tool Cleaning.
   3. Galvanized Metal (indicated to be painted):
      a. Step 1: Steam clean.
      b. Step 2: Scuff with 120-grit sand paper.
   4. Mechanical and Electrical Work: Prepare metal surfaces as specified this Section, "Steel and Iron" for type of material. Remove dirt, grease, and oil from canvas and cotton insulating covering.
   5. Concrete and Concrete Masonry Units: Refer to Section 09 96 00, High Performance Coatings.

B. Protection:
   1. Protect adjacent surfaces and areas from coating operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide suitable protection, but not any damage caused by other trades.

2. Removal of Hardware and Miscellaneous Items: Remove electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings, fastenings, and the like prior to starting work.
3. Toxic Materials: Where toxic materials, and both toxic and explosive solvents are used, take regular appropriate precautions. Conform to manufacturer's and applicable AHJ requirements including adequate ventilation and other protective measures.
4. Sand, clean, dry, etch, neutralize and test surfaces under adequate illumination, ventilation and temperature requirements.

3.06 APPLICATION

A. Application – General:
1. Do not paint unless substrates are acceptable and environmental conditions (heating; ventilation; lighting) are acceptable for applications of products.
2. Apply paint and decorating material in a workmanlike manner using skilled and trade qualified applicators as noted under "Quality Assurance" provisions indicated above.
3. Minimum finishing standards shall comply with MPI "Premium" Grade finish requirements. Use application methods in accordance with manufacturer's instructions, and best trade practices for type and application of materials used.
4. Apply paint and coatings within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or the manufacturer's paint specifications require earlier applications.

B. Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
1. Match final coat to accepted color samples. Tint each coat of paint progressively lighter to enable confirmation of number of coats.
2. Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to three feet.

C. Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.

D. Film Thicknesses Tests:
1. Use suitable wet film gauge, verify mil thicknesses, in selected locations.
2. Test surfaces with Tooke or accepted dry film gauge, for total dry film thicknesses.

3.07 FINISHES

A. Coating finishes shall be as selected and indicated on Finish Schedule on Drawings, and described below. Provide written list of manufacturer, product name, color, number, sheen, for each paint used. See Paragraph 1.04 B, Maintenance Materials.

B. Gloss: Except as noted herein, paint ceiling surfaces using flat finish; paint ceilings in restrooms using a semi-gloss finish; and paint metals using a satin-like or semi-gloss finish.

C. Except as indicated, paint walls and ceilings using minimum two coats of washable latex over prime/sealer coat in accordance with Premium finish requirements.

3.08 EXTERIOR PAINTING AND FINISHES

A. Ferrous, Non-ferrous and Galvanized/Galvannealed Metals: See Section 09 96 00, High-Performance Coatings.

3.09 INTERIOR PAINTING AND FINISHES

A. Ferrous Metal: 3-Coat System, Acrylic, Semi-gloss.
   1. Manufacturers/Products: Basis of Design: Benjamin Moore.
      a. Primer (shop-apply): Benjamin Moore "Ultra Spec HP" Acrylic Metal Primer HP04, rust Inhibitive waterborne acrylic primer, 1.7 to 2.3 mils dft.
      b. Intermediate: Benjamin Moore "Ultra Spec HP" DTM (direct-to-metal) Acrylic Semi-Gloss HP29, 2.3 mils dft.
      c. Finish Coats: Benjamin Moore "Ultra Spec HP" DTM Semi-Gloss, HP29, 2.3 mils dft.

B. Exposed Mechanical and Electrical Work in Finished Spaces:
   1. Manufacturers/Products:
      a. Tnemec Series 115 "Uni-Bond DF", one-coat self-crosslinking acrylic.
      b. Benjamin Moore, "Ultra Spec 500 Interior Primer N534" 1.8 mils dft, and two coats Ultra Spec HP" DTM Acrylic Semi-Gloss HP29, at 2.3 mils dft per coat.
      c. Or approved.

C. Concrete, and Concrete Masonry Units: See Section 09 96 00.
   1. Do not paint brick.

D. Miscellaneous: Consult MPI Manual for surfaces not scheduled and follow Owner's directions.

3.10 FIELD QUALITY CONTROL

A. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Owner:
   1. Runs, sags, hiding or shadowing by inefficient application methods;
   2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles;
   3. Damage due to touching before paint is sufficiently dry or other contributory cause;
   4. Damage due to application on moist surfaces or caused by inadequate protection from the weather;
   5. Damage and/or contamination of paint due to wind blown contaminants (dust, sand blast materials, salt spray, and the like).

B. Make good painted surfaces rejected by the Owner, at no cost to Owner.
   1. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted.
   2. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.11 REPLACEMENT OF HARDWARE AND MISCELLANEOUS ITEMS

A. Reinstall items previously required to be removed.

3.12 PROTECTION

A. Protect newly painted surfaces from moisture, condensation, contamination, dust, salt spray and freezing temperatures until paint coatings are completely dry. Curing periods shall exceed the manufacturer's recommended minimum time requirements.

B. Erect barriers or screens and post signs around work areas as required.

3.13 CLEAN-UP

A. Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

B. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

C. Clean equipment and dispose of wash water/solvents as well as other cleaning and protective materials (e.g. rags, drop cloths, masking papers), paints, thinners, paint removers/strippers in accordance with the safety requirements of AHJ.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Finish coatings for exterior new, and existing rusted, galvanized and ferrous metal:
a. Existing, rusted exterior window lintels.
b. New brackets at rooftop railings and concrete countertops, lintels at openings, and others as indicated.
c. New exterior galvannealed hollow metal doors and frames.
2. Primers and finish coatings shall be shop-applied as indicated.
a. Field-applied finish coatings only where indicated and accepted by Architect.
b. Request clarification of locations for field-applied finishes before beginning work.
3. Field-applied opaque finish coatings for existing concrete walls and ceilings in unconditioned spaces.
4. Field-applied opaque finish coatings for new Concrete Masonry Unit (CMU) walls in unconditioned spaces.
5. Preparation of surfaces.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures
2. Section 01 35 91 - Historic Treatment Procedures
3. Section 05 01 99 - Restoration and Maintenance of Metals: cleaning of lintels
4. Section 05 50 00 - Metal Fabrications: lintels, brackets, angle trim, and as indicated
5. Section 08 11 13 - Hollow Metal Doors and Frames: exterior doors and frames

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM	Standards indicated herein
SSPC	Steel Structures Painting Council Volume 2: Systems and Specifications

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meeting: Convene prior to beginning work of this Section, to review substrates, conditions and requirements of the work.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each material specified including substrate preparation.
a. Informational Submittal: SDSs for each product used on the Project.
2. Materials and Products Lists (typed): Submit complete lists of specified products.
3. Samples:
a. Brushout Samples: Before commencing work, prepare 8 inch x 10 inch samples of selected colors on acceptable substrate, painted with coating in colors and glosses selected, for review and acceptance by Architect.
b. For samples not accepted, furnish up to two additional brush-out samples until accepted, and Architect issues written authorization to proceed.
c. When accepted, samples shall become standard of quality for appropriate on-site surface with one of each sample retained on-site for reference.

4. Qualifications Data: For manufacturer and applicator.
5. Warranty: Submit sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
   1. Record Documents: Information for each coating used on Project. Provide a written list of paint manufacturer, product name, color, number, sheen, the area in which the paint was used and the specific location (e.g. general walls, doorframes, restrooms).
      a. List actual products used in construction. Copy of specifications not accepted unless they show specific products and color numbers purchased for actual painting.
   2. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Qualifications of Manufacturers and Materials: Except as otherwise scheduled, use only specified and accepted products. Do not substitute without Owner's written acceptance in conformance with Section 01 25 00, Substitutions and Product Options.

B. Applicator/Painting Subcontractor Qualifications: Shall have a minimum of 5 years proven satisfactory experience of comparable magnitude and complexity to work of this project.
   1. If requested, provide contact information for the last three jobs including the Owner, Architect, completion date and amount of subcontract cost.

C. Source Limitations: Obtain primary coating systems from one manufacturer; use thinners and cleaning products recommended by the primary coating manufacturer.

D. Perform adhesion testing of metallic substrates in according to ASTM D3359, Method A.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver in unopened containers, bearing manufacturer's original labels, including date of manufacturer. Products not bearing original label will be rejected.
   2. Store and mix material outside building. Store per manufacturer's recommendations.
   3. Safety: Take precautions to prevent fire hazards and spontaneous combustion; conform to manufacturer's recommendations and applicable regulatory requirements.
   4. Store as required by governing Codes and ordinances.

1.07 PROJECT SITE CONDITIONS

A. Environmental Requirements:
   1. Perform painting work of this Section when surface temperature and ambient air temperatures are between 40 and 120 deg F or when relative humidity is above 85%.
   2. Perform no painting work in rain, fog or mist; or when the relative humidity is above manufacturer's limits. Do not apply paint to damp or wet surfaces.

B. Illumination: Verify required lighting level minimum 15 footcandles per square foot, unless more stringent levels required by governing Codes and ordinances.
   1. Perform no painting work when the relative humidity is above 85 percent or when the dew point is less than 5 deg F variance between the air/surface temperature.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:

1. Specified Product Warranties: Manufacturer's 10-year warranty against failure under ordinary wear and usage. Failure includes peeling, chipping, cracking, rusting of substrate, and delamination, chalking, and loss of color and sheen beyond performance published by manufacturer at time of bid.
    a. Manufacturer shall provide material necessary to repaint affected areas where coating fails to comply with the values specified within warranty period.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC.
2. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of Authorities Having Jurisdiction (AHJ).

2.02 MANUFACTURERS

A. Manufacturers:
1. Tnemec,
2. Or approved.

B. Products: Basis of Design: Tnemec products and systems are cited herein for type, quality and performance.

C. Subject to compliance with requirements, systems by other manufacturers accepted for review. Submit substitution requests for comparable products in conformance with Section 01 25 00, Substitutions and Product Options and include the following:
1. Complete product information, testing and performance data allowing comparison between proposed products and specified products.

2.03 HIGH-PERFORMANCE COATINGS

A. General:
1. Primers:
    a. Conform to State of Washington Volatile Organic Compounds (VOC) Rules and Regulations (Chapter 173-490 WAC) for shop applied, non toxic metal primer.
    b. No zinc chromate, inorganic zinc or lead primers accepted.
    c. Primer shall have no "critical recoat window."

B. Ferrous 3-Coat System:
1. Primer, Shop-Applied (and field touch-up): Series 394 PerimePrime aromatic polyurethane, mio-zinc filled primer.
    a. Performance:
        1) Salt Spray (Fog): No cracking or delamination of film. No more than 3 percent rusting on plane and no more than 1/64 inch rust creepage at scribe after 10,250 hours exposure when tested according to ASTM B117.
        2) Static Fatigue: Primer shall provide AISC Class B faying surface of slip-critical joints in accordance with RCSC/ASTM A325.
2. Intermediate Coat, Field-Applied: Series L69 High-Build Epoxoline II.
    a. Performance:
        1) Adhesion: Minimum 1,943 psi, tested per ASTM D4541.
        2) Salt Spray (Fog): Maximum 3/16 inch rust creepage at scribe, after 20,000 hours of exposure, tested per ASTM B117.
3. Finish Coat Field-Applied: Series 750 UVX, low VOC, hybrid aliphatic polyurethane, Semi-Gloss.

a. Performance:
   1) Abrasion (1000 gram load): Maximum 19 mg loss after 1,000 cycles per ASTM D4060.
   2) Adhesion: Minimum 1,633 psi pull, average of three tests, tested per ASTM D4541.
   3) Salt Spray (Fog): No blistering, cracking, rusting or delamination of film after 1,500 hours of exposure, tested per ASTM B117.
   4) QUV Exposure: No gloss loss and maximum 0.67 DE_{00} color change after 4,000 hours of exposure, tested per ASTM G53.

C. Existing Rusted Galvanized Steel or Ferrous Steel - 3-Coat System, Field-Applied:
1. Primer: Series 394 PerimePrime, aromatic polyurethane, mio-zinc filled primer.
   a. Performance: As specified in subparagraphs 2.03 B. 1. a. above.
2. Intermediate Coat: Series 27 F.C. Typoxy, polyamide epoxy.
   a. Performance:
      1) Anti-corrosive Properties: Yes.
      2) Adhesion: 2,240 psi, tested per ASTM D4541.
3. Finish Coat: Series 1095 Endura-Shield, aliphatic acrylic polyurethane, Semi-Gloss.

D. Overcoat System / Recoating of Exterior Ferrous Surfaces Previously Coated:
1. Spot Primer in Field: Series 27 FC Typoxy, polyamide epoxy.
   a. Performance Requirements: As specified in subparagraph 2.03 C.2 above.
2. Overcoat in Field: Series 750 UVX, low VOC, hybrid aliphatic polyurethane, semi-gloss.
   a. Performance: As specified in subparagraph 2.03 B. 3. a. above.

E. Galvanized and Non-ferrous 3-Coat System (galvannealed hollow metal doors and frames):
1. Primer, Shop-Applied (and touch-up of welded or abraded galvanized areas): Series 394 PerimePrime.
   a. Performance: As specified in subparagraphs 2.03 B. 1. a. above.
2. Intermediate Coat Field-Applied: Series L69 High-Build Epoxoline II.
   a. Performance: As specified in subparagraph 2.03 B. 2. a. above.
3. Finish Coat, Field-Applied: Series 750 UVX.
   a. Performance: As specified in subparagraph 2.03 B. 3. a. above.

F. Existing Concrete - 3-Coat System, Field-Applied Opaque Finish:
1. Filler and Surfacer (at concrete not previously painted): Series 1254/130 Epoxoblock WB/Enviro-Fill.
2. Intermediate Coat: Series 156 Enviro-Crete, Modified Waterborne Acrylate, Matte.
   a. Characteristics: 50.9% solids (+/- 2%), 49 g/L VOC (unthinned).
3. Finish Coat: Series 156 Enviro-Crete.

G. New Concrete Masonry Units (CMU) - 2-Coat Epoxy System, Field-Applied:
1. Intermediate Coat (self-priming): Series 280, "Tneme-Glaze", modified polyamine epoxy.
   a. Characteristics: 100% solids glaze-like corrosion-resistant coating, 25 g/L VOC.
2. Finish Coat: Series 280, "Tneme-Glaze".

H. Adhesion Promoter: As recommended by coating manufacturer.

I. Colors: As selected by Architect. Up to two custom colors.

J. Field Touch-Up:
1. Non-Galvanized Surfaces: Comply with manufacturer’s recommendations.
2. Touch-up for Damaged Galvanized Surfaces: Tnemec Series 394 PerimePrime, 2.5 mils dry thickness, or approved.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Prepare surfaces as recommended by manufacturer and following:
   1. SSPC SP-1, Solvent Cleaning.
   2. Exposed, uncoated, ungalvanized ferrous metals are to be prepared in accordance with SSPC SP-6, Commercial Blast Cleaning. Prime by end of same work day and before forming of any visible rust.
   3. Old rusted galvanized steel or ferrous steel shall be prepared in accordance with SSPC SP-2 or SP-3, Hand or Power Tool Cleaning, to remove loosely adhered rust and existing coatings.
      a. Prime by end of same work day and before forming of any visible rust.
   4. Previously Coated Surfaces: Lightly scuff 100 percent of the surface with “Scotch Brite” type scouring pad to create surface profile and eliminate gloss on factory-applied coatings (do not use steel wool; do not expose bare metal); clean with mild solution of TSP followed by 10:1 mix of water and vinegar. Rinse and let dry completely before applying finish field coat.
   5. Galvanized/Galvannealed metal surfaces shall be first steam cleaned and then scuffed with 120 grit sandpaper, or if required, shall be prepared per ASTM D6386 abrasive blast or zinc phosphate treatment. Surface preparation will vary depending on substrate and exposure conditions. Verify preparation requirements with coatings manufacturer.
   6. Concrete: SSPC-SP 13/NACE 6. Clean and dry.
   7. CMU: Allow mortar to cure 28 days. Surfaces shall be clean, dry, sound and free of contaminants. Level protrusions and mortar splatter. At pinholes, apply surfacer/filler recommended by coating manufacturer prior to application of intermediate coat (self-priming).
   8. Surfaces shall be clean, dry and free of rust, oil, grease, and other contaminants prior to beginning application of coatings.

3.03 APPLICATION

A. General: Apply the work in strict conformance with manufacturer’s instructions.

B. Finish Coatings: Apply to millage thickness recommended by manufacturer and not less than specified below:
   1. New Ferrous Surfaces:
      a. Primer: Apply Series 394 PerimePrime at 2.5 to 3.5 mils dry film thickness (dft).
      b. Intermediate Coat: Apply Series L69 at 2.0 to 4.0 mils dft.
      c. Finish Coat: Apply Series 750 UVX at 2.5 to 5.0 mils dft.
      d. Total Thickness: 7.0 to 12.5 mils dft.
   2. Existing Rusted Galvanized Steel or Ferrous Steel:
      a. Primer: Apply Series 394 at 2.5 to 3.5 mils dft.
      b. Intermediate Coat: Apply Series 27 at 3.0 to 5.0 mils dft.
      c. Finish Coat: Apply Series 1095 at 2.0 to 3.0 mils dft.
      d. Total Thickness: 7.5 to 11.5 mils dft.
   3. Overcoat System / Recoating of Exterior Ferrous Surfaces Previously Coated: Apply to millage thickness recommended by manufacturer and not less than specified below.

a. Apply spot primer of Series 27 FC Typoxy at 4.0 to 6.0 mils dft
b. Apply overcoat of Series 750 UVX at 3.0 to 5.0 mils dft.
c. Total Thickness: 7.0 to 11.0 mils dft.

4. Galvanized/Galvannealed and Non-Ferrous Surfaces:
   a. Primer: Apply 394 PerimePrime at 2.0 to 4.0 mils dft (repair/touch-up).
   b. Intermediate Coat: Apply Series 69 at 2.0 to 4.0 mils dft.
   c. Finish Coat: Apply Series 750 at 2.5 to 5.0 mils dft.
   d. Total Thickness: 6.5 to 13 mils dft.
5. Concrete:
   a. Filler/Surfacer: Apply Series 1254/130 Epoxoblock WB/Enviro-Fill at 75 to 150 sq. ft. per gallon.
   b. Intermediate Coat: Apply Series 156 Enviro-Crete at 4.0 to 8.0 mils dft.
   c. Finish Coat: Apply Series 156 Enviro-Crete at 4.0 to 8.0 mils dft.
   d. Total Thickness: 8 .0to 16.0mils dft (over Filler/Surfacer).
6. Concrete Masonry Units (Epoxy):
   a. Intermediate Coat: Apply Series 280 Tneme-Glaze at 8.0 to 10.0 mils dft.
   b. Finish Coat: Apply Series 280 Tneme-Glaze at 8.0 to 10.0 mils dft.
   c. Total Thickness: 12.0 to 16.0 mils dft.

3.04 FIELD QUALITY CONTROL

A. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Owner:
   1. Runs, sags, hiding or shadowing by inefficient application methods;
   2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles;
   3. Damage due to touching before paint is sufficiently dry or other contributory cause;
   4. Damage due to application on moist surfaces or caused by inadequate protection from the weather;
   5. Damage and/or contamination of paint due to wind blown contaminants (dust, sand blast materials, salt spray, and the like).

B. Make good painted surfaces rejected by the Owner, at no cost to Owner.
   1. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted.
   2. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

C. Film Thickness Tests; as directed:
   1. Use suitable wet film gauge, verify mil thicknesses, in selected locations.
   2. Test surfaces with Tooke or accepted dry film gauge, for total dry film thicknesses.

3.05 CLEANING

A. As work proceeds, and on completion of work, promptly remove spilled, splashed, and splattered products so as not to damage surface.

3.06 SCHEDULES

A. Color Schedule: Refer to Finish Schedule on Drawings.

END OF SECTION

DIVISION 10
SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. General requirements for code-required signs and symbols, as indicated on the Drawings, including but not limited to the following:
a. Symbol of accessibility (including restrooms).
b. Others as indicated or required by code.
2. During construction, protect existing signage painted on concrete wall at restroom entrances.

B. Related Sections:
1. Section 01 35 16 - Alteration Project Procedures: attach signs to existing walls

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

Accessible Design	2010 Standards for Accessible Design (ADA), and ICC/ANSI A117.1, Accessible signage provisions
IBC	International Building Code with City of Mercer Island amendments

1.03 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer's technical data and installation instructions.
2. Shop Drawings: Include for each sign scheduled:
a. Sign Layouts (Sign Face Patterns): Full size sign layouts for each sign, including exact text, braille, special graphics, borders and the like.
b. To scale wall elevations/locations and heights.
c. Sizes, thicknesses, materials and finishes.
d. Fabrication details, mounting methods.
e. Sign Layouts shall be reviewed by the Architect before proceeding with work; Contractor shall allow for rearrangement of the copy and final letter spacing.
3. Artwork: Full size paper proofs for special graphics including arrows, symbols and logos.
4. Typefaces: Photocopy of full typographic alphabets for each typeface as indicated on the drawing.
5. Templates: Half-size paper spacing templates for each individual set of dimensional letters. Layouts shall display characters in solid form, not outline.
6. Samples:
a. Submit minimum 6 inch square samples for approval of the following materials and assemblies prior to proceeding with work:
1) Paint showing color and texture.
2) Silkscreen sample message on acrylic plastic plaque material, all colors.
b. When requested, furnish full-size samples of the sign materials.

1.04 QUALITY ASSURANCE

A. Manufacturer/Fabricator/Installer: Accomplished technician skilled in sign graphics and letter design as needed to achieve consistent and optically correct appearance.

1.05 PROJECT SITE CONDITIONS

A. Location of Signs: The approximate location of signs is indicated on the Drawings and the Signage Schedule.

B. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting; indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. IBC.
2. 2010 Standards for Accessible Design, Section 703, Signs.
3. ICC/ANSI A1117.1.

2.02 SIGNAGE - GENERAL

A. General:
1. Graphics, including text, symbols and arrows shall be executed in such as manner that edges and corners are true and clean.
2. Tactile Text: Rout acrylic sign panel to accept inset dimensional acrylic letters and symbols. Apply color to reverse side of inset message. Message to stand off 1/32 inch from face of sign.
3. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with 2010 Standards for Accessible Design (ADA) and ICC/ANSI A117.1.
   a. Accompany text with Grade 2 braille. Provide all text translation from English to Braille.
   b. Produce precisely formed characters with square cut edges free from burrs and cut marks.
   c. Panel Material: Clear acrylic sheet with opaque color coating, subsurface applied.
   d. Raised-Copy Thickness: Not less than 1/32 inch.
4. Use non-toxic products only, low in VOC.

B. Signage Colors: Submit samples for Architect approval prior to fabrication.

2.03 MANUFACTURERS

A. Manufacturers:
1. ASI-Modulex.
2. Best.
3. KROY Sign Systems.
4. Nelson-Harkins.
5. Or accepted.

2.04 CODE-REQUIRED SIGNAGE

A. Code-Required Signage:
1. Description: Extruded aluminum frames and faces suitable to exterior installation.
2. Signage Sizes: As indicated on Drawings.
3. Letters and Graphics:
   a. Font: Helvetica, All Caps.
   b. Height: 3/4 inch, unless otherwise indicated.
   c. Center right justified.

d. Raised copy and Braille.
e. Characters: Universal symbol of accessibility, fire, and the like.

4. Materials: Solid metal sign base, with polished raised letters, characters and braille, or painted raised letters, characters and braille, as indicated.
5. Colors: As selected by Architect form manufacturer's standard color range. Blue and white where required by ADA.
6. Contrast: Review options with Architect that comply with ADA requirements.
7. Mounting: Wall-mounted.
8. Mounting Height: As indicated on Drawings.

2.05 MATERIALS

A. Aluminum Panel: ASTM B209; sheet in Alloy 5052 in 0.080-inch thickness unless otherwise specified, and aluminum bar Alloy 6063 unless otherwise specified.

B. Extruded Aluminum Channel Frame: ASTM B221, 6063 T5/T6, 0.125 inch thick.

C. Coatings: Acrylic polyurethane for acrylic and aluminum surfaces. Follow manufacturers recommendations for surface preparation and application.
1. Manufacturers:
a. DuPont.
b. Matthews.
c. PPG.

D. Acrylic Polyurethane Paint: Lead and heavy metal free, abrasion resistant, top coat/primer paint system for aluminum substrate.

2.06 MISCELLANEOUS PRODUCTS AND ACCESSORIES

A. Provide brackets, fittings, hardware and anchors as required for fastening to substrates.

B. Fasteners: As detailed, or as recommended by signage manufacturer for conditions of installation. Provide stainless steel or other noncorrosive fasteners at exterior locations.

C. Miscellaneous accessories as indicated and as required.

2.07 FABRICATION

A. Fabrication:
1. Shop Assembly: Fabricate signs in shop, under shop conditions.
2. Fabricate signage materials to provide smooth cut surfaces, exact in shape and dimension to the design specified. Ensure that rectangular shapes retain 90 degree angles at all corners and remove traces of burr and slag from cut surfaces.
3. Install Braille where required.
4. Make provisions for mounting as necessary for secure permanent attachment.

B. Preparation for Delivery: Clean signs of handling marks, fingerprints, dust and debris before wrapping for shipment. Wrap and protect signs with plastic or paper and use sufficient padding to prevent nicks damage to the sign faces during shipment.

PART 3 - EXECUTION

3.01 PREPARATION

A. Review installation conditions to receive signage.

1. Review placement of signs.
2. Verify field measurements, field construction criteria and coordination of other work prior to submittal of shop drawings.
3. Review substrates, mechanical, electrical, plumbing elements or other objects or conditions that may cause visual or physical conflicts.

3.02 INSTALLATION

A. Install signage where indicated, as required by applicable codes, secured with specified fasteners and according to manufacturer's written instructions.

B. General:
1. Anchorage: Attach signs to walls and surfaces in the manner indicated by the Drawings and using concealed anchorage suitable to the mounting situation or as noted. Signs shall have at least one physical anchoring device. Where signs are adhesively applied, adhesive shall be spread over full contact area.
2. Install at heights and locations indicated.
3. Install signs plumb, square/true to line, and level to a tolerance of 1/8 inch in 5 feet.
4. Install signs so they do not protrude or obstruct according to accessibility standards.
5. Patch wall surfaces disturbed by the installation process and repair any damage caused.
6. Sign surfaces shall be free of distortion and other defects in appearance.

C. Wall-Mounted Signs (where not otherwise indicated): Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent wall. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.

D. Corrosion Prevention: Do not allow dissimilar metals to be installed in contact with each other without adequate electrolytic protection.

E. Patch wall surfaces disturbed by the installation process and repair any damage caused.

3.03 CLEANING AND PROTECTION

A. Post-installation Protection: Protect sign surface from damage due to public or construction activity. Signs which cannot be adequately protected in such area shall not be installed and their installation scheduled for a later date when their location is safe from potential damage.

B. Types of Protection: Protect units from damage until final acceptance. Signs shall be covered with dust-proof plastic or paper wrapping and corners padded from impact damage if they remain in an active public or construction area. Barricades or caution tape shall be used to direct traffic away from sign until Substantial Completion.

C. Remove temporary protective covering or strippable films no later than Substantial Completion.

D. At completion of installation, clean soiled surfaces in accordance with manufacturer's instructions.
1. Repair or replace damaged signs.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Flush-type, stainless steel ceiling-mounted toilet compartments.
a. Terms "partitions" and "compartments" are used interchangeably in this Section.
2. Flush-type, stainless steel wall-mounted urinal screens.
3. ADA-compliant hardware and accessories required for complete installation.

B. Related Sections:
1. Section 01 11 00 - Summary of Work: FOIC and FOIO toilet accessories

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

Accessible Design	2010 Standards for Accessible Design (ADA)
ASTM A666	Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
IBC	International Building Code, with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate placement of surface-mounted support brackets at concrete walls.
2. Coordinate toilet accessories installed mounted on or within partitions/compartments.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer’s literature describing panel construction, materials, finishes, hardware and accessories.
2. Manufacturer’s installation instructions.
3. Shop Drawings: Detailed layout of work, including plan, elevations, dimensions, door swings, and anchorage details at compartments and screens.
a. Include field-verified measurements of job conditions on Shop Drawings.
4. Samples: Submit 12 inch x 12 inch sample of panel showing finished edge on two sides and core construction of two sides.
5. Certificate of Compliance: Furnish affidavit from manufacturer, stating that delivered materials and finishes conform to these Specifications.
6. Qualifications Data: For installer.
7. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
1. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Shall be a factory-authorized installer with a minimum of 3 years of experience of comparable magnitude and complexity to the work of this project.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
   1. Deliver in manufacturer's original unopened packages identifying manufacturer, product, color, stock number and order number. Provide protective coverings to prevent marring of surfaces.
   2. Acceptance at Site: Verify undamaged condition.
   3. Stack and store containers in accordance with manufacturer's recommendations.
   4. Handle materials in such a manner as to prevent damage to products or finishes.

1.07 PROJECT SITE CONDITIONS

A. Field Verification: Field-verify conditions and indicate measurements on Shop Drawings.
   1. Allow for adjustments where field-verification prior to fabrication is not possible or may delay the Work.

B. Environmental Conditions: Comply with partition/compartment manufacturer requirements.

1.08 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
   1. Specified Product Warranties: Manufacturer's standard 5-year warranty against defects in design, materials and workmanship.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
   1. Comply with IBC Chapters 10 and 11B, or local building code, if more stringent.
   2. Comply with 2010 Standards for Accessible Design (ADA).

2.02 MANUFACTURERS AND PRODUCTS

A. Manufacturers:
   1. Accurate Partitions Corp.
   2. Bradley Corporation/The Mills Company (Bradley)
   3. Global Steel Products
   4. Hadrian Manufacturing Inc.

B. Product: Basis of Design: Hadrian toilet compartments and screens.

C. Subject to compliance with requirements, products from manufacturers listed accepted for review. For manufacturers not listed, submit substitution requests in compliance with Section 01 25 00 Substitutions and Product Options.
   1. If selection of alternate manufacturer requires changes to adjacent construction, perform approved changes at no additional cost to the Owner.

2.03 TOILET COMPARTMENTS AND SCREENS

A. Toilet Compartments and Screens: Hadrian "Stainless Steel - Standard".
   1. Description: Overhead-mounted stainless steel toilet compartments and wall-mounted screens.
   2. Doors, Panels and Screens: 1 inch thick, flush appearance; 22 gauge cover sheets.

3. Pilasters 1-1/4 inch thick, 22 gauge cover sheets, tops reinforced with 20 gauge channel..
4. Construction: Stainless steel face sheets with locking bar edge moldings mitered, welded, and ground smooth at corners, sealed/pressure bonded to "verticel" honeycomb core composed of virgin long fiber paper with maximum 1/2 inch cell size.
5. Fire Classification: Class A Interior Finish.

B. Material:
1. Stainless steel, ASTM A666, Type 304.
2. Finish: Smooth, No. 4 Satin finish.
3. Recycled Content: 76 percent post-consumer; and 15 percent pre-consumer.

2.04 HARDWARE, FITTINGS AND ACCESSORIES

A. Mounting Brackets: Manufacturer's standard Stainless steel, Satin finish.
1. Toilet Partitions/Compartments Panels: U-brackets.
2. Screen Panels: Continuous double ear bracket.
3. Anchorage to rigidly attach panels to walls and pilasters by through-bolting with tamper-resistant screws, bolts and anchoring devices suitable to concrete substrates.

B. Pilaster Shoes: 4 inch high stainless steel welded one-piece design, secured by concealed retainer clips, polished finish.

C. Hardware, Fittings, and Accessories: Manufacturer’s standard design, heavy-duty, tamper-proof type operating hardware and accessories, stainless steel, Satin finish.
1. Door Hinges: Wrap-around type, adjustable gravity positioning hinges, through-bolted to pilasters.
2. Provide for each compartment door indicated:
a. ADA compliant hardware, including mounting heights.
b. One pair of hinges, to hold door open when compartment is not occupied, except at “barrier-free” stalls where door is to close by itself.
c. Combined Coat Hook and bumper.
d. Door Latch: Manufacturer’s standard thumbturn lever barrier-free latch unit, designed to meet accessibility requirements.

D. Fasteners and Anchorage: Provide theft-resistant screws, bolts, expansion shields, and the like, suitable to concrete substrates and as required for a complete installation.

E. Partition/Compartment Mounted Toilet Accessories: See Section 10 28 00, Toilet Accessories.

2.05 COMPARTMENT ASSEMBLIES

A. Compartment and Screen Configurations and Dimensions: As indicated on Drawings.

B. Doors: Unless otherwise shown, provide in-swinging 24 inch wide doors.
1. Regular Doors: Stand open when not in use.
2. “Barrier-free” Stall Doors: 32 inch clear opening, swing as shown. Doors shall be marked with International Symbol of Access.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.

1. Check for correct height and spacing to support structures and plumbing fixtures affecting quality and execution of work.
2. Check for correct locations and sizes of blocking and reinforcements in walls.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions for conditions of installation.

B. General:
1. Install Work rigid, plumb, level.
2. Securely anchor partitions/compartments, pilasters and screens to wall with brackets. Maintain clearances indicated. Anchor pilasters to floor with adjustable, corrosion-resistant leveling plates, sleeves and threaded rods.
3. Install hardware as recommended by manufacturer.
4. Securely anchor wall brackets. Conceal evidence of drilling, cutting, and fitting in finished work.
5. Seal voids against moisture penetration.

3.03 ADJUSTING

A. Adjust and lubricate hardware for proper operation after installation.

B. Adjust brackets to provide uniform clearances not exceeding:
1. Panels and wall: 1 inch.
2. Pilasters and panels: 1/2 inch.
3. Pilasters and doors: 3/16 inch.

C. Adjust pilaster shoes to fit flush with floors.

D. Set in-swinging door hinges to hold doors ajar when not latched. Install wall or panel to stop door travel on doors outswinging more than 105 degrees and to return to the fully closed position.

3.04 CLEANING AND REPAIR

A. After installation is complete, remove protective covering, clean exposed partitions/compartments and surfaces.

B. Touch up minor scratches. Leave work clean and free from defects.

C. Replace damaged or scratched parts and materials, as directed.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Toilet accessories mounted on walls and toilet partitions as indicated.

B. Related Sections:
1. Section 01 11 00 - Summary of Work: FOIC and FOIO toilet accessories

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ICC A117.1	Accessible and Usable Buildings and Facilities Standards
Accessible Design	2010 Standards for Accessible Design (ADA)
ASTM C1036	Standard Specification for Flat Glass
ASTM F446	Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area
IBC	International Building Code with City of Mercer Island amendments

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate with framing, blocking/backing and partitions as required.
2. Templates and Concealed Anchor Plates: Furnish to applicable trades as required for each accessory together with location and mounting height.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: Manufacturer's standard product data on each item.
2. Shop Drawings: Show complete details of toilet accessories and required installation.
3. Samples: For each type of exposed finish.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, Product Storage and Handling Requirements, and following:
1. Deliver in original unopened protective packaging.
2. Store in original protective packaging to prevent soiling, damage, and wetting.
3. Handle to prevent damage to finished surfaces during installation.
4. Maintain protective covers on accessories until installation is complete.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC.
2. Comply with 2010 Standards for Accessible Design, and ICC A117.1.

3. Backing: Establish required backing/blocking or fastening method for grab bar installations to comply with requirements of IBC.

2.02 MANUFACTURERS

A. Manufacturers/Products:
   1. Bobrick
   2. Bradley
   3. Products: Basis of Design: Bobrick products as indicated, or approved.

2.03 TOILET ACCESSORIES

A. Products: See Drawings for locations.
   1. Grab Bars: 1-1/2 inch outside diameter, heavy-duty, 0.05 inch thick stainless steel, with satin finish. Discontinuous type with concealed mounting.
      a. Product: Bobrick B-5806.
   2. Mirror: Frameless, 18-8, 20 gauge Type 304 stainless steel mirror polished to a No. 8 mirror finish, with four corner countersunk holes for mounting, and 1/4 inch masonite backing.
      a. Product: Bobrick B-1556-2436.
   3. For FOIC toilet accessory products furnished by Owner, see Section 01 11 00, Summary of Work.
      a. Toilet Paper Dispensers.
      b. Seat Cover Dispensers.
      c. Sanitary Napkin Dispensers.
      d. Partition-Mounted Sanitary Napkin Disposals.
      e. Forced air hand dryers.
      f. Soap dispensers.
   4. For FOIO toilet accessory (trash cans) see Section 01 11 00, Summary of Work.

B. Materials:
   1. Stainless Steel: Type 302/304, No. 4 Satin finish, unless indicated otherwise.
   2. Mounting Devices: Manufacturer's standard, tamperproof.
   3. Accessories Keys: Provide minimum of six universal keys for Owner servicing.

C. Fabrication:
   1. General: Construct accessories of stainless steel, unless otherwise specified. Key accessories alike.
   2. Templates and Concealed Anchor Plates: Furnish to applicable trades as required for each accessory together with location and mounting height.

2.04 MISCELLANEOUS ACCESSORIES

A. Pipe Wrap: Antimicrobial molded plastic, white, insulating pipe coverings.
   1. Product: Truebro "Lav-Guard".

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.
   1. Verify correct dimensions.
   2. Verify toilet partitions to receive accessories are securely installed.
   3. Verify plumbing fixture spacings affecting accessory installations.

B. Clean substrates, removing projections, filling voids, and sealing joints.

C. Protect surrounding areas and surfaces to preclude damage during work of this Section.

3.02 INSTALLATION

A. Install the work in accordance with manufacturer's directions for conditions of installation.

B. See Drawings for mounting heights, locations, sizes not indicated, and the like.
   1. Where not given, locate as directed by Architect.

C. Secure items with *tamperproof fasteners* recommended by manufacturer for substrates indicated. Secure items with concealed anchor plates.
   1. Attach to supporting structure with coarse threaded screws long enough to securely engage backing.
   2. Anchor mirrors to concrete walls using fasteners recommended by manufacturer for substrate and conditions.
   3. Install units level, plumb, firmly anchored and at heights indicated.

D. Grab Bars:
   1. Install to withstand a downward load of at least 250 lbf, when tested per ASTM F446.
   2. Install grab bars on proper support to withstand specified resistance.
   3. Where toilet accessories are installed below grab bars, ensure clearance of at least 3 inches to allow unobstructed use of grab bars.

3.03 ADJUSTING AND CLEANING

A. Adjust and lubricate moving parts and hardware for smooth, quiet operation and watertight closure.

B. Repair, refinish or replace components damaged during installation. Remove nonpermanent labels. Clean exposed surfaces. Leave installation free of imperfections.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Portable fire extinguishers, mounting brackets, and accessories as indicated and in conformance with Fire Marshal requirements for type of occupancy.

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ANSI/NFPA 10	Portable Fire Extinguishers
IFC	International Fire Code
IBC	International Building Code with City of Mercer Island amendments

1.03 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each product and accessory specified.
2. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
1. Warranty Documentation.
2. Include inventory list of fire extinguishers installed, and maintenance data for each.

1.04 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
1. Specified Product Warranty: Manufacturer's warranty to repair or replace fire extinguishers that fail in materials or workmanship within 5-years.
a. Failures include but are not limited to the failure of hydrostatic test according to NFPA 10, and the faulty operation of valves or release levers.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements:
1. Comply with IBC and IFC.
2. Accessibility: 2010 Standards for Accessible Design (ADA) and IBC Chapter 11.
3. Signage/Lettering: Comply with AHJ for letter type, size, and spacing.

2.02 FIRE EXTINGUISHERS

A. Manufacturers:
1. Amerex.
2. Badger.
3. Potter Roemer.
4. Substitutions: Submit in compliance with Section 01 25 00 Substitutions and Product Options.

B. Fire Extinguishers: Dry or wet chemical fire extinguishers, in accordance with ICC-IFC.
   1. Typical (except as noted): Dry chemical fire extinguishers with a minimum rating of 2A:10B:C.
      a. Product: Amerex type ABC dry-chem 5# or 10# fire extinguishers, or approved.
   2. Storage Rooms: Type as required by code for storage rooms.

C. UL Listed Products: Fire Extinguishers UL listed and bear UL “Listing Mark” for type, rating, and classification of extinguisher.

D. General: Provide fire extinguishers throughout in quantity and type as required by the referenced standards, the Fire Marshal and City of Mercer Island, and as indicated. Provide fire extinguisher cabinets where indicated, in accordance with ICC-IFC.

E. Refer to Drawings for mounting conditions.

2.03 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer’s standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated. Red baked enamel finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

B. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective or undercharged extinguishers.

3.02 INSTALLATION

A. Install brackets and extinguishers in locations indicated on Drawings and in compliance with requirements of NFPA 10 and AHJ.

B. Securely fasten mounting brackets, signs, and other accessories to the structure square, plumb, and in compliance with the manufacturer's instructions.
   1. Locate at mounting heights indicated, or if not indicated, at heights acceptable to AHJ.

C. Apply signage decals or vinyl lettering as indicated or as required by AHJ.

D. Paint or touch-up walls surrounding extinguisher cabinets damaged by installation.

3.03 ACCEPTANCE

A. Receive approval of installation from the Fire Department or AHJ.

END OF SECTION

DIVISION 12
FURNISHINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. Custom site-cast concrete countertop, with integral color and finish indicated.
2. Supporting structure, mounting system, anchorage and accessories required.
3. Delegated design of supporting structure, mounting systems and anchorage.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: supporting wall below countertop
2. Section 05 50 00 - Metal Fabrications: supporting brackets
3. Section 08 33 26 - Overhead Coiling Counter Doors

1.02 REFERENCES

A. Reference Standards: Applicable provisions of the most recent adopted editions of the following standards shall apply to the work of this Section:

ASTM Standards indicated herein

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate with concrete wall supporting concrete countertop, and with other installation requirements of overhead coiling door and counter.

B. Pre-Installation Meetings: Convene to review coordination and conditions of installation.

1.04 SUBMITTALS

A. Submit in accordance with Sections 01 33 10, Submittal Procedures, and 01 33 23, Shop Drawings, Product Data and Samples:
1. Product Data: For each product specified.
2. Shop Drawings: Plans, sections, elevations, dimensions and details including attachments to structure. Include field-verified measurements.
a. Show locations and sizes of support structure, and mounting system.
b. Indicate loads imposed on support beam and adjacent construction.
3. Delegated Design: Engineering calculations for counter reinforcing and anchorage to structural support. Calculations and Shop Drawings shall be stamped by a qualified engineer licensed in State of Washington.
4. Samples for Verification: Two 6 inches square samples with sealer options, showing full range of variations in appearance characteristics expected in completed Work.
5. Qualifications Data: For fabricator/installer.
6. Warranty: Sample copy of warranties.

B. Closeout: Submit in accordance with provisions of Section 01 78 00, Closeout Submittals:
1. Maintenance Data: Cleaning and maintenance instructions.
2. Warranty documentation.

1.05 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Shall have a minimum of 5 years of experience in the custom field-fabrication of countertops of the type and quality specified, with a record of successful in-service performance.

1.06 PROJECT SITE CONDITIONS

A. Field Measurements: Verify adjacent construction and indicate measurements on Shop Drawings. Notify Architect of discrepancies, including resolutions to discrepancies.

1.07 WARRANTY

A. Provide warranties in accordance with Section 01 78 00, Closeout Submittals and following:
   1. Specified Product Warranty-Finish: Fabricator's 2-year Finish wear warranty, against staining (permanent discoloration that cannot be removed) and excessive cracking.

PART 2 - PRODUCTS

2.01 PERFORMANCE

A. Regulatory Requirements: Comply with IBC including seismic requirements.

B. Performance:
   1. Delegated Design: Engage a qualified professional engineer licensed in State of Washington to design the following:
      a. Custom field-cast and finished countertop units, structural support, and anchorage meeting design intent, sizes, configurations and conditions indicated.
      b. Steel brackets and supporting structure of the proper size and configuration for the intended use, of thickness and strength sufficient to properly support the installed countertop.
      c. Connections, anchorage, and fastener spacings.

2.02 CONCRETE COUNTERTOPS

A. Concrete Countertops:
   1. Description: Custom field-cast concrete countertops.
   2. Overall Dimensions: As indicated on Drawings.
   3. Edge Details: Standard Square Edge.
   4. Surface Finish/Texture: Polished finish.
   5. Gloss: Extra-low-gloss.

B. Mounting: Mounted with exposed surface-mounted steel brackets.

C. Materials: Fabricator's standard proprietary concrete materials, integral color, and mix, meeting performance requirements, aesthetic properties, and color of accepted Samples for Verification indicated.

2.03 ACCESSORIES

A. Mounting System: Steel structural support mounting system, of type, thickness and connections as determined by engineering calculations for performance required and suitable to concrete substrates.
   1. Steel: ASTM A36 shapes as determined by engineering calculations.

B. Accessories: Provide embeds, clips, hangers, high-density plastic or steel shims, and other accessories required to install concrete countertops.

C. Adhesives: Adhesives formulated specifically for bonding conditions, meeting VOC limitations and recommended by pre-cast fabricator.

D. Miscellaneous Accessories: As required for a complete installation.

2.04 FINISHES

A. Field-Applied Sealer at Concrete Countertop: Matching sealer approved by Architect during submittal process.

B. Field-Applied Coating at Steel Exposed Structural Support: As specified in Section 09 96 00, High-Performance Coatings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Section.
   1. Examine conditions under which units will be installed, for compliance with requirements for installation tolerances and other conditions affecting performance.
   2. Verify that structural supports are firm, secure and in required locations.

B. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Comply with provisions of the Contract Documents for concrete countertop installation.

B. Site-Cast Formwork: Form-facing panels shall provide continuous, true, and smooth finished concrete surfaces without joints, with edge contours indicated.
   1. Fabricate forms for countertops with sufficient wall thickness to resist plastic concrete loads without detrimental deformation; and solid backing and form supports to ensure that edge form liners remain in place during concrete application.
   2. Use commercially formulated form-release agent that will not bond with, stain, or adversely affect precast surfaces, or impair subsequent surface or joint treatment.

C. Site-cast countertops in sizes and shapes indicated, with texture on all exposed surfaces including the back (mirror) side, meeting sample approved by Architect.

D. Protect freshly placed concrete from premature drying and excessive temperatures; and allow to cure as required to achieve strength.

E. Fabrication Tolerances: Each finished unit shall comply with the following:
   1. Overall Length and Width of Units: Plus or minus 1/16 inch.
   2. Local Smoothness: 1/16 inch per 10 feet.
   3. Length and Width of Block-outs and Openings within One Unit: Plus or minus 1/4 inch.

3.03 ADJUSTING AND CLEANING

A. Remove and replace countertops that are broken, chipped, stained, or otherwise defective or damaged.

B. Clean countertops using mild soap and water applied with a nylon brush. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage surfaces.

END OF SECTION

DIVISION 22
PLUMBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SCOPE OF WORK – GENERAL

A. This section specifies general requirements for plumbing installations and includes requirements common to more than one section of Division 22. It expands and supplements the requirements specified in sections of Division 01.

B. Provide materials, labor, transportation, tools, permits, fees, inspections, utilities, and incidentals necessary for the complete installation of plumbing work indicated and described in the Contract Documents.

C. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction is required for work indicated or specified under this section of work or work specified in other sections, provide material and equipment which is usually furnished with such systems to complete the installation, whether mentioned or not.

1.03 SEQUENCE OF WORK

A. Conduct work in sequence to provide least interference to the activities of the Owner, and to permit orderly transfer of activities and equipment to completed areas.

B. Work shall be substantially complete by the dates listed in Division 01 Section “Summary”.

1.04 ALTERNATES

A. Refer to Division 01 Section “Alternates” for description of alternates. Review Contract Documents for additional information.

1.05 DEFINITIONS

A. Provide: Furnish and install complete and ready for intended use.

B. Indicated: Indicated on drawings.

C. Noted: Noted on Drawings or in Specifications.

D. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

E. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

F. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

G. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in shafts.

H. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.06 CODES AND STANDARDS

A. Code Compliance: Comply with most current edition adopted by the Authority Having Jurisdiction of following:
1. International Building Code (IBC), Standards and Amendments.
2. International Mechanical Code (IMC), Standards and Amendments.
3. International Fire Code (IFC), Standards and Amendments.
4. Uniform Plumbing Code (UPC), Standards and Amendments.
5. International Fuel Gas Code (IFGC).
6. National Fire Protection Association (NFPA).
7. National Electrical Code (NEC); NFPA 70.
8. Washington State Energy Code, Commercial Provisions.
9. Applicable State and local codes, laws, and ordinances.

1.07 SAFETY OF PEOPLE AND PROPERTY

A. Comply with applicable laws, ordinances, rules, and regulations of any public authority for the safety of persons and property, including requirements of the Washington Department of Safety and Health (DOSH) or the Occupational Safety and Health Act (OSHA) whichever is most stringent, and Division 01, General and Supplementary Conditions.

1.08 PERMITS AND FEES

A. Obtain and pay for required permits and fees necessary to fully complete work included in the Contract Documents.

1.09 INTENT AND INTERPRETATION

A. Drawings and Specifications supplement each other, and any details contained in one and not the other shall be included as if contained in both. Items not specifically mentioned in the specifications or noted on the drawings, but which are obviously necessary to make a complete working installation shall be included.

B. Drawings are partly diagrammatic and do not necessarily show exact location of new piping and existing utilities, unless specifically dimensioned.

C. Riser and other diagrams are schematic only and do not necessarily show the physical arrangement of equipment. They shall not be used for obtaining quantities or lineal runs of piping.

D. Grilles, fixtures, or other pieces of equipment shall be centered on windows, wall spaces, or other items, unless specifically dimensioned otherwise.

E. Location of piping shall be checked to determine that it clears openings and structural members; that it may be properly concealed; and that it clears cabinets, lights and equipment having fixed locations.

F. Mechanical drawings shall serve as working drawings for Division 22 work. Refer to Architectural, Structural, and Electrical drawings for additional detail affecting the installation of work. Architectural drawings shall take precedence over the Mechanical drawings if any dimensional discrepancies exist.

G. Approximate location of each item is indicated on the drawings. These drawings are not intended to give complete and exact details regarding to location. Exact locations are to be determined by actual measurements at the building. Not all pipe offsets are indicated on the drawings.

1.10 SUBMITTAL OF EQUIPMENT FOR APPROVAL

A. Refer to Division 01 requirements for submittal definitions, requirements, and procedures. Additional requirements are listed below.

B. Shop drawings, catalog information, and material schedules shall be submitted for approval on materials and equipment prior to ordering.

C. Submittals not meeting the following requirements will be returned for revision:
1. Provide a cover page for each item or group of items (schedule group, single fixture plus trim group, etc.).
2. Each cover page must be clearly identified with the project name, specification number and paragraph number.
3. Submittal package must be accompanied by an itemized index listing specification section, paragraph number, item, and manufacturer; larger projects will be index tabbed by specification section with index for each section.

1.11 GUARANTEE

A. Guarantee satisfactory operation of material and equipment installed under Division 22. Repair or replace any defective materials, equipment, or workmanship which may show itself within one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GENERAL MATERIALS AND EQUIPMENT REQUIREMENTS

A. Where more than one manufacturer is listed, provide products of only one manufacturer for each type of product.

B. Materials used under this Contract, unless specifically noted otherwise, shall be new and of the latest and most current model line produced by the manufacturer. Outdated “new” equipment is not acceptable.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2.02 EQUIPMENT AND MATERIAL SUBSTITUTIONS

A. Throughout these Contract Documents, various materials, equipment, apparatus, etc., are specified by manufacturer, brand name, type, or catalog number. Such designation is to establish standards of desired quality and construction and shall be the basis of the bid.

B. Where more than one manufacturer is listed, and only one manufacturer's catalog number is indicated, that standard of quality and construction shall be maintained by materials supplied by other manufacturer(s).

C. Substitutions of equipment or materials shall be made only with written prior approval. Prior approval requests must be received at least ten (10) days prior to bid date unless otherwise instructed. Refer to Division 1 Section "Substitution Procedures" for procedures in requesting substitutions. The Owner or Owner's representative shall review all substitution requests for final approval.

D. Acceptance of substitution request signifies manufacturer recognition only. No attempt has been made to check each item as to special features, capacities, or physical dimensions required by this project. Verify requirements before submitting for approval. Acceptance of exact features, sizes, capacities, etc., all of which must meet or exceed design requirements will be determined when submitted during the construction phase.

E. Substitution request must include manufacturer, specific model number, special features, physical dimensions, and capacities of proposed equipment. Verify requirements before submitting for approval.

F. The Contractor shall bear full responsibility for substituted equipment and materials, including, but not limited to:
1. Costs.
2. Available space requirements
3. Effect on other trades
4. Changes in electrical requirements
5. Changes in structural requirements.

PART 3 - EXECUTION

3.01 COMMISSIONING

A. At a minimum, comply with requirements of the Washington State Energy Code.

B. Refer to Division 1 Section "Commissioning" for additional requirements.

3.02 COORDINATION

A. Refer to Division 1 Section "Project Management and Coordination".

B. Coordinate available space for equipment and systems with other trades. Refer to Architectural, Structural and Electrical Drawings for additional building details necessary for coordination.

C. Cutting, patching, wiring, finishing or any other work required for relocation of work installed due to interferences between work of the various trades will be at no additional cost to the Owner.

3.03 MANUFACTURER'S INSTRUCTIONS

A. Furnish proper equipment and/or materials required for installation as intended by the manufacturer, for all work described under Division 22. If needed for proper installation or operation, request advice and supervisory assistance from the representative of the specific manufacturer. Manufacturer's published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufactured materials or equipment, unless otherwise indicated. Promptly notify the Architect in writing of any conflict between the requirements of the Contract Documents

and the manufacturer's directions and obtain the Architect's instructions before proceeding with the work.

3.04 EXAMINATION OF SITE

A. Visit site of proposed work and become familiar with conditions affecting work. Verify measurements at the building before beginning work.

3.05 EXISTING UTILITIES AND PIPING

A. Locations of existing concealed lines and connection points have been indicated as closely as possible from available information. Assume that such connection points are within a 10-foot radius of indicated locations. Where connection points are not within this radius, contact the Architect for a decision before proceeding.

3.06 LAYING OUT WORK

A. Locations of equipment and devices, as shown on the drawings, are approximate unless dimensioned. Exact locations of such items shall be determined from the Construction Drawings. Verify physical dimensions of each item of mechanical equipment, piping system, to fit available space and promptly notify the Architect prior to roughing-in if conflicts appear. Coordinate equipment to available space and access routes through construction. Offsets or transitions in piping systems required for proper system operation and/or installation, whether indicated on drawings or not, shall be provided at no additional cost to Owner.

3.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.

C. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

3.08 ACCESSIBILITY

A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate location of concealed equipment and devices requiring access with location of access panels and doors. Allow ample space for removal of parts that require replacement or servicing.

3.09 TEMPORARY USE OF NEW EQUIPMENT

A. New equipment shall not be used for temporary heating, cooling or ventilation unless authorized in writing by the Owner.

3.10 PIPE SLEEVES

A. Vertical Piping:
   1. Sleeve Length: 1 inch above finished floor.
   2. Provide sealant for watertight joint.

3. Blocked Out Floor Openings: Provide 1½-inch angle set in silicon adhesive around opening.
4. Drilled Penetrations: Provide 1½-inch angle ring or square set in silicone adhesive around penetration.

B. Plastic, Sheet Metal, or Moisture-Resistant Fiber: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.

C. Pipe Passing Through Below Grade Exterior Walls:
1. Zinc-coated or cast-iron pipe.
2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.

D. Pipe Passing Through Quarry Tile, Terrazzo, or Ceramic Tile Floors:
1. Brass pipe.
2. Connect sleeve with floor plate.

E. Pipe Passing Through Concrete Beam Flanges, Except Where Brass Pipe Sleeves Are Specified:
1. Galvanized steel pipe or black iron pipe with asphalt coating.
2. Connect sleeve with floor plate except in mechanical rooms.

F. Pipe Passing Through Mechanical, Laundry, and Animal Room Floors above Basement:
1. Galvanized steel pipe or black iron pipe with asphalt coating.
2. Connect sleeve with floor plate except in mechanical rooms.

G. Penetrations in concrete beam flanges are permitted but are prohibited through ribs or beams without prior approval from the Architect.

H. Clearances:
1. Provide allowance for insulated piping.
2. Wall, Floor, Floor, Partitions, and Beam Flanges: 1-inch greater than external; pipe diameter.
3. Rated Openings: Caulked tight with firestopping material complying with ASTM E814 in accordance with Section 07 84 00 to prevent the spread of fire, smoke, and gases.

3.11 CUTTING AND PATCHING

A. Comply with Division 01 Section, “Execution” for general requirements for cutting and patching.

B. Cutting shall be performed with masonry saws, core drills or similar equipment to provide neat and uniform openings.

C. Patching shall match adjacent surfaces in materials and finish. Do not endanger or damage installed work through procedures and processes of cutting and patching.

D. Arrange for repairs required to restore other work, which was damaged as a result of mechanical installations. Upon receipt of written authorization from Architect, Contractor will be authorized for cutting and patching work that is necessitated by ill-timed, defective, or non-conforming installations.

E. No additional compensation will be authorized for cutting and patching work that is necessitated by ill-timed, defective, or non-conforming installations.

F. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
1. Uncover work to provide for installation of ill-timed work.
2. Remove and replace defective work.
3. Remove and replace work not conforming to requirements of the Contract Documents.

4. Remove samples of installed work as specified for testing.
5. Install equipment and materials in existing structures.
6. Upon written instructions from the Architect, uncover and restore work to provide for observation of concealed work.

G. Cut, remove, and legally dispose of selected mechanical equipment, components, and materials as indicated, including, but not limited to removal of mechanical piping, heating units, and other mechanical items made obsolete by new work.

H. Protect structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

I. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

3.12 EXCAVATING AND BACKFILLING

A. Provide trench and pit excavation and backfilling required for mechanical work, inside and outside the building, including repairing of finished surfaces, required shoring, bracing, pumping, and protection for safety of persons and property. Remove excess earth resulting from their work from the site. Comply with Local or State safety codes. Check the elevations of the utilities entering and leaving the building. If such elevations require excavations lower than the footing levels, notify the Architect of such conditions before excavations are commenced. Make the excavations at the minimum required depths to not undercut the footings.

3.13 FILLING, BACKFILLING, AND COMPACTION

A. General: Remove debris and decayable matter from areas to be filled before proceeding. Use only materials approved by the Architect for fills. Obtain Architect's approval before filling against concrete or masonry walls. Make fills as soon as feasible to insure maximum settlement.

B. Compaction of Fills: Compact by ASTM D1557, Method "A," 95% density under paved areas and building areas to 10 feet beyond building perimeter, 90% elsewhere. Place fills in lifts which, when compacted, shall not exceed 8-inches in depth and compact with multiple-wheeled pneumatic-tired rollers or other approved methods. Fills made from cuts shall be made and compacted in one operation so that the material is not left exposed to rain while in an uncompacted state.

C. Fills under Interior Slabs: 4-inches of ¾-inch to 1½-inches washed gravel, evenly graded. Cover with reinforced Kraft paper. Lap joints 4-inches, turn up 4-inches onto vertical surfaces. Repair any punctures in membrane before pouring concrete.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this section.

1.02 SCOPE OF WORK – GENERAL

A. This section specifies procedural requirements for plumbing installations project closeout, including but not limited to:
   1. Project Record Document submittal.
   2. Operation and Maintenance Manual submittal.
   3. Operation and Maintenance Instruction and Training.
   4. Plumbing Equipment and Systems Startup.
   5. Final Cleaning.
   6. Owner Training Session Agenda.

B. Related Sections include the following:
   1. Section 01 10 00 “Submittal Procedures”.
   2. Section 01 77 00 “Closeout Procedures”.

1.03 PROJECT RECORD DOCUMENTS

A. Record differences between plumbing work as installed and as shown in Contract Drawings on a set of prints of plumbing drawings furnished by Architect. Return these prints to Architect at completion of project. Notations made on drawings shall be neat and legible. Comply with Division 01 requirements.

B. Mark drawings to indicate revisions to plumbing piping, size and location both exterior and interior; including locations of coils, dampers, and other control devices, filters, motors and similar items requiring periodic maintenance; actual equipment locations; concealed equipment and control devices; mains and branches of piping systems, with valves and control devices located and numbered.

C. Revise equipment and fixture schedules on the Drawings to indicate actual installed manufacturer and model numbers.

D. Mark specifications to indicate change orders; actual equipment and materials used.

1.04 OPERATION AND MAINTENANCE MANUALS

A. Prepare and submit Operation and Maintenance (O&M) Manuals for plumbing systems provided. Comply with Section 01 78 00 “Closeout Submittal” requirements.

B. Provide master index at beginning of Manual showing sections and items included.

C. Cover section: List name, address, and phone number of Project Architect, General Contractor, Mechanical Engineer, Plumbing Contractor, and all Plumbing Subcontractors. Provide a list of equipment suppliers with address and phone number.

D. Provide a separate section for each Section of the Specifications. Provide index for each section listing equipment included. Include all items specified.

E. Include descriptive literature (manufacturer's catalog data) of each manufactured item. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined. Data sheets shall be originals or clean copies of originals.

F. One draft copy of the manual shall be submitted for review, comment, and approval, as applicable, at least 15 days prior to substantial completion or training, whichever is first. After approval, submit three (3) copies of manual to Architect for approval unless otherwise directed by Division 01 requirements. Information to be included in manual:
   1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
   2. Manufacturer's printed operating procedures to include startup, break-in, routine, and normal operating instructions; regulation, control, stopping shutdown, and emergency instructions; and summer and winter operating instructions.
   3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
   4. Servicing instructions and lubrication charts and schedules.
   5. Schematic control diagrams for each automatic control system. Mark the correct operating setting for each control instrument on these diagrams.
   6. Valve schedule indicating the valve symbol (tag number), valve location by room number and description, valve purpose and system served, and valve size. Provide one (1) corresponding set of full-size plumbing prints showing these valve locations for cross-reference. A second complete set of valve schedules (8½-inches x 11-inches) encased in transparent plastic laminate and fitted in an aluminum holding frame shall be furnished to the Owner.
   7. Testing, Adjusting and Balancing Report.
   8. Test records and certifications.
   9. Equipment startup reports.
   10. Warranty information and letters of guarantee.
   11. Instruction period checklist for each equipment item.

G. Complete O&M Manual shall be available for use by Owner's representatives during instruction and training sessions.

1.05 OPERATION AND MAINTENANCE INSTRUCTION AND TRAINING

A. Instruct Owner's Representative(s) in the Operation and Maintenance procedures described in Operation and Maintenance Manual. Comply with Division 01 Section requirements.

B. Enlist services of qualified personnel, including each sub-trade and factory trained specialists for each major piece of equipment, to attend training sessions and provide operation and maintenance instructions.

C. Submit training agenda, schedule, and list of representatives for review 30 days prior to training sessions. Confirm attendance by written notification to all participants.

D. Prepare checklist of all equipment and systems requiring instruction and maintenance for verification and agreement by the Owner's Representative of satisfactory startup and instruction. Checklist shall include a statement of completion by the Contractor, date and topic(s) covered in each training session, and an attendance list of all participants at each training session. Submit a copy of checklist for review 30 days prior to training sessions. Include copy of the completed checklist in Operation and Maintenance Manual.

E. Refer to individual Division 22 Sections for additional instruction/training requirements.

F. All plumbing systems shall be properly functioning prior to instruction period.

PART 2 - PRODUCT (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 PLUMBING EQUIPMENT AND SYSTEMS STARTUP

A. Provide the services of a factory-authorized service representative to test and inspect unit installation, provide startup service, and demonstrate and train Owner's maintenance personnel.

B. Include certification of factory-authorized representative status as part of equipment submittal from manufacturer. Include copies of any installation and startup instructions, manufacturer's checklists and other forms used in startup as part of the equipment submittal.

C. Include written startup reports with test data for equipment in Operation and Maintenance Manual.

D. All construction debris, including electrical wiring debris shall be removed from units prior to equipment startup. Areas surrounding and served by equipment being started must be free of construction debris, sheetrock dust, and any materials that may adversely affect the equipment.

3.02 FINAL CLEANING

A. Refer to Division 01 general requirements for final cleaning.

B. At time of final cleanup, clean all fixtures and equipment and leave in condition for use intended. Vacuum cabinet interiors of control panels, air handling units, etc. to remove all construction debris including electrical wiring debris.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pressure gauges and pressure gauge taps.

B. Thermometers and thermometer wells.

1.02 REFERENCE STANDARDS

A. ASME B40.100 – Pressure Gauges and Gauge Attachments.

B. ASTM E1 – Standard Specification for ASTM Liquid-in-Glass Thermometers.

1.03 SUBMITTALS

A. See Section 22 05 00 – Common Work Results for Plumbing for submittal procedures.

B. Product Data: Provide list that indicates use, operating range, total range, and location for manufactured components.

1.04 FIELD CONDITIONS

A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 - PRODUCTS

2.01 PRESSURE GAUGES

A. Manufacturers:
1. Dwyer Instruments, Inc.
2. Moeller Instrument Company, Inc.
3. Omega Engineering, Inc.

B. Pressure Gauges: ASME B40.100, drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
1. Case: Steel with brass bourdon tube.
2. Size: 4½-inch diameter.
3. Midscale Accuracy: 1%.
4. Scale: Psi.

2.02 PRESSURE GAUGE TAPPINGS

A. Gauge Cock: Tee or lever handle, brass for maximum 150 psi.

2.03 STEM TYPE THERMOMETERS

A. Manufacturers:
1. Dwyer Instruments, Inc.
2. Omega Engineering, Inc.
3. Weksler Glass Thermometer Corp.

B. Thermometers – Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
   1. Size: 9-inch scale.
   2. Window: Clear Lexan.
   3. Accuracy: 2%, per ASTM E77.
   4. Calibration: Degrees F.

2.04 LIGHT-ACTIVATED THERMOMETERS

A. Direct-Mounted, Light-Activated, Digital-Type Thermometers:

B. Scale(s): Degrees Fahrenheit (F) and degrees Celsius (C), F/C switch.
   1. Range: -50°F to 300°F.

C. Case Form: Plastic, Adjustable angle.

D. Connector: 1¼ inches, with NPT screw threads.

E. Stem: Aluminum and of length to suit installation.

F. Design for Thermowell Installation: Bare stem.

G. Display: ½-inch LCD digits, wide ambient formula.
   1. Lux Rating: 10 Lux.

H. Sensor: Glass passivated NTC thermistor.

I. Accuracy: ±1% of reading or 1°F, whichever is greater.
   1. Recalibration: Through case potentiometer adjustment.

2.05 THERMOMETER SUPPORTS

A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

2.06 TEST PLUGS

A. Test Plug: ¼-inch or ½-inch brass fitting and cap for receiving ⅛-inch outside diameter pressure or temperature probe with neoprene core for temperatures up to 200°F.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install pressure gauges with pulsation dampers. Provide gauge cock to isolate each gauge. Extend nipples and siphons to allow clearance from insulation. Provide siphon on gauges in steam systems.

C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2½- inches for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

D. Provide instruments with scale ranges selected according to service with largest appropriate scale.

E. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

F. Adjust gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe markers.

1.02 RELATED REQUIREMENTS

A. Section 09 91 23 – Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

A. ASME A13.1 – Scheme for the Identification of Piping Systems.

1.04 SUBMITTALS

A. Schedules:
1. Submit plumbing component identification schedule listing equipment, piping, and valves.
2. Detail proposed component identification data in terms of wording, symbols, letter size, and color coding to be applied to corresponding product.
3. Valve Data Format: Include id-number, location, function, and model number.

B. Product Data: Provide manufacturer's catalog literature for each product required.

C. Project Record Documents: Record actual locations of tagged valves.

PART 2 - PRODUCTS

2.01 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

A. Pipe Markers: ¾-inch diameter and higher.

2.02 IDENTIFICATION APPLICATIONS

A. Piping: Pipe markers.

B. Pumps: Nameplates.

C. Tanks: Nameplates.

D. Valves: Tags.

2.03 NAMEPLATES

A. Manufacturers:
1. Brimar Industries, Inc.
2. Kolbi Pipe Marker Co.
3. Seton Identification Products.

B. Description: Laminated piece with up to three lines of text.
   1. Letter Color: White.
   2. Letter Height: ¼-inch.
   3. Background Color: Black.

2.04 TAGS

A. Manufacturers:
   1. Brady Corporation.
   2. Brimar Industries, Inc.
   3. Craftmark Pipe Markers.
   4. Kolbi Pipe Marker Co.
   5. Seton Identification Products.

B. Metal: Brass, 19 gauge 1½-inches in diameter with smooth edges, blank, smooth edges, and corrosion-resistant ball chain. Up to three lines of text.

C. Valve Tag Chart: Typewritten 12-point letter size list in anodized aluminum frame.

2.05 PIPE MARKERS

A. Manufacturers:
   1. Brady Corporation.
   2. Brimar Industries, Inc.
   3. Craftmark Pipe Markers.
   4. Kolbi Pipe Marker Co.
   5. Seton Identification Products.

B. Comply with ASME A13.1.

C. Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.

D. Underground Flexible Marker: Bright-colored continuously printed ribbon tape, minimum 6 inches wide by 4 mil, 0.004-inch thick, manufactured for direct burial service.

E. Identification Scheme, ASME A13.1:
   1. Primary: External Pipe Diameter, Uninsulated or Insulated.
   2. Secondary: Color scheme per fluid service.
      a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

PART 3 - EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive identification products.

3.02 INSTALLATION

A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags in clear view and align with axis of piping.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

E. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Glass fiber insulation.

B. Fitting covers.

C. Protective shielding guards.

1.02 REFERENCE STANDARDS

A. ADA Standards – 2010 ADA Standards for Accessible Design.

B. ASTM C177 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

C. ASTM C547 – Standard Specification for Mineral Fiber Pipe Insulation.

D. ASTM C795 – Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

E. ASTM C1822 – Standard Specification for Insulating Covers on Accessible Lavatory Piping.

F. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

G. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

H. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.

1.03 SUBMITTALS

A. See Section 22 05 00 – Common Work Results for Plumbing for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer ‘s Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer ‘s identification, product density, and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.05 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 - PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER INSULATION

A. Manufacturers:
   1. CertainTeed Corporation.
   2. Johns Manville Corporation.
   3. Knauf Insulation.
   4. Owens Corning Corporation.

B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. K Value: ASTM C177, 0.24 at 75°F.
   2. Maximum Service Temperature: 850°F.
   3. Maximum Moisture Absorption: 0.2% by volume.

C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm inch.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

2.03 FITTING COVERS

A. Manufacturers:
   1. Johns Manville Corporation “Zeston.”
   2. P.I.C. Plastics, Inc.
   3. Proto Corporation.
   4. Speedline Corporation.

B. Jacket: One-piece molded type fitting covers, off-white color.
   1. PVC Plastic.
      a. Minimum Service Temperature: 0°F.
      b. Maximum Service Temperature: 150°F.
      c. Moisture Vapor Permeability: 0.002 perm inch, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 20 mil.
   2. Connections: Brush on welding adhesive and pressure-sensitive color matching vinyl tape.

2.04 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers
   1. Manufacturers:
      a. Buckaroos, Inc.
      b. McGuire Manufacturing.
      c. MVG Molded Products.
      d. Oatey Company.

e. Plumbrex Specialty Products.
f. Truebro, IPS Corporation.

B. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA Standards.

C. Comply with ASTM C1822 for covers on accessible lavatories.

D. Microbial and Fungal Resistance for Interior and Exterior: Comply with ASTM G21.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:
1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. Inserts and Shields:
1. Application: Piping 1½-inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.

3.03 PIPING INSULATION SCHEDULE

Design Operating Temperature Range	Insulation Conductivity		Nominal Pipe Diameter (Inches)				
	Conductivity Range (BTU-Inches/ (h-ft²-°F)	Mean Rating Temperature (°F)	<1	1 To <1½	1½ to <4	4 To <8	8 To >8
ALL DOMESTIC WATER AND SERVICE HOT WATER SYSTEMS							
105-140[1]	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5
40-60[2]	0.22-0.28	75	0.5	0.5	1.0	1.0	1.0

[1] Hot water and hot water circulation.
[2] Cold water and rainwater piping.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sanitary waste piping, buried beyond 5 feet of building.

B. Sanitary waste piping, buried within 5 feet of building.

C. Sanitary waste piping, above grade.

D. Domestic water piping, buried within 5 feet of building.

E. Domestic water piping, above grade.

F. Storm drainage piping, buried within 5 feet of building.

G. Pipe flanges, unions, and couplings.

H. Pipe hangers and supports.

1.02 REFERENCE STANDARDS

A. ASME B16.18 – Cast Copper Alloy Solder Joint Pressure Fittings.

B. ASME B16.22 – Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

C. ASTM A74 – Standard Specification for Cast Iron Soil Pipe and Fittings.

D. ASTM B32 – Standard Specification for Solder Metal.

E. ASTM B42 – Standard Specification for Seamless Copper Pipe, Standard Sizes.

F. ASTM B88 – Standard Specification for Seamless Copper Water Tube.

G. ASTM B88M – Standard Specification for Seamless Copper Water Tube (Metric).

H. ASTM B813 – Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.

I. ASTM B828 – Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.

J. ASTM C564 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

K. ASTM C1277 – Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.

L. ASTM D2235 – Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.

M. ASTM F628 – Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core.

N. AWS A5.8M/A5.8 – Specification for Filler Metals for Brazing and Braze Welding.

O. CISPI 301 – Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

P. CISPI 310 – Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

Q. MSS SP-58 – Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation.

R. NSF 61 – Drinking Water System Components – Health Effects.

S. NSF 372 – Drinking Water System Components – Lead Content.

1.03 SUBMITTALS

A. See Section 22 0 500 –Common Work Results for Plumbing for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturer's catalog information. Indicate valve data and ratings.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Sanitary Waste Piping Systems: Soil, waste, and vent piping.

2.02 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 service weight.
   1. Fittings: Cast iron.
   2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.

B. Cast Iron Pipe: CISPI 301, hubless.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gasket and stainless-steel clamp and shield assemblies.

2.03 SANITARY WASTE PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gaskets and stainless-steel clamp-and-shield assemblies.

2.04 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Pipe: ASTM B42, hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
   2. Joints: AWS A5.8M/A5.8, BCuP copper/silver braze.

2.05 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.

2.06 STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 service weight.
   1. Fittings: Cast iron.
   2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: Neoprene gaskets and stainless-steel clamp-and-shield assemblies.

2.07 STORM DRAINAGE PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: Neoprene gaskets and stainless-steel clamp-and-shield assemblies.

2.08 PIPE FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 inch and Under:
   1. Ferrous Pipe: Class 150 malleable iron threaded unions.
   2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Sizes Over 1 inch:
   1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. No-Hub Couplings:
   1. Testing: In accordance with ASTM C1277 and CISPI 310.
   2. Gasket Material: Neoprene complying with ASTM C564.
   3. Band Material: Stainless steel.
   4. Eyelet Material: Stainless steel.
   5. Manufacturers:
      a. ANACO-Husky.
      b. Fernco.
      c. Ideal-Tridon Group.
      d. MIFAB, Inc.
      e. Mission Rubber Co.

2.09 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

C. Excavate in accordance with Section 22 05 00.

D. Backfill in accordance with Section 22 05 00.

E. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems, use flux also complying with NSF 61 and NSF 372.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Escutcheons

B. Drains.

C. Cleanouts.

D. Hose bibbs.

E. Hydrants.

F. Refrigerator valve and recessed box.

G. Water hammer arrestors.

H. Mixing valves.

I. Trap-seal primers.

1.02 REFERENCE STANDARDS

A. ADA Standards – 2010 ADA Standards for Accessible Design.

B. ASME A112.18.1 – Plumbing Supply Fittings.

C. ASME A112.6.3 – Floor and Trench Drains.

D. ASME A112.6.4 – Roof, Deck, and Balcony Drains.

E. ASSE 1013 – Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies.

F. ASSE 1017 – Temperature Actuated Mixing Valves for Hot Water Distribution.

G. ASSE 1019 – Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance.

H. ASSE 1070 – Performance Requirements for Water Temperature Limiting Devices.

I. NSF 61 – Drinking Water System Components – Health Effects.

J. NSF 372 – Drinking Water System Components – Lead Content.

1.03 SUBMITTALS

A. See Section 22 05 00 – Common Work Results for Plumbing for submittal procedures.

B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 ESCUTCHEONS

A. Material:
1. Fabricate from nonferrous metal.
2. Chrome-plated.
3. Metals and Finish: Comply with ASME A112.18.1.

B. Construction:
1. One-piece for mounting on chrome-plated tubing or pipe and one-piece or split-pattern type elsewhere.
2. Internal spring tension devices or setscrews to maintain a fixed position against a surface.

2.03 DRAINS

A. Manufacturers:
1. Jay R. Smith Manufacturing Company.
2. Josam Company.
3. MIFAB, Inc.
4. WADE, McWane, Inc.
5. Zurn Industries, LLC.

B. Roof Drains:
1. Assembly: ASME A112.6.4.
2. Body: Lacquered cast iron with sump.
3. Strainer: Removable polyethylene dome with vandal-proof screws.
4. Accessories: Coordinate with roofing type.

C. Roof Overflow Drains:
1. Lacquered cast iron body and clamp collar and bottom clamp ring.

D. Floor Drains:
1. Manufacturers:
a. Jay R. Smith Manufacturing Company.
b. Josam Company.
c. MIFAB, Inc.
d. Zurn Industries, LLC.
e. WADE, McWane, Inc.

E. Floor Drain (FD-1):
1. ASME A112.6.3; lacquered cast iron or stainless-steel, two-piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

2.04 CLEANOUTS

A. Manufacturers:
1. Jay R. Smith Manufacturing Company.
2. Josam Company.

3. MIFAB, Inc.
4. WADE, McWane, Inc.
5. Zurn Industries, LLC.

2.05 WALL HYDRANTS

A. Manufacturers:
1. Arrowhead Brass & Plumbing, LLC.
2. Jay R. Smith Manufacturing Company.
3. Murdock Manufacturing, Inc.
4. Zurn Industries, LLC.

2.06 BACKFLOW PREVENTERS

A. Manufacturers:
1. Apollo Valves.
2. Cash Acme, a brand of Reliance Worldwide Corporation.
3. Watts Regulator Company, a part of Watts Water Technologies.
4. Zurn Industries, LLC.

B. Reduced Pressure Backflow Preventer Assembly:
1. ASSE 1013; cast bronze body and stainless-steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under backpressure in case of diaphragm failure, and non-threaded vent outlet.
2. Threaded gate valves.

2.07 WATER HAMMER ARRESTORS

A. Manufacturers:
1. Jay R. Smith Manufacturing Company.
2. Josam Company.
3. MIFAB, Inc.
4. Precision Plumbing Products, Inc.
5. Sioux Chief Manufacturing Co., Inc.
6. Watts Regulator Company, a part of Watts Water Technologies.
7. Zurn Industries, LLC.

2.08 MIXING VALVES

A. Thermostatic Mixing Valves:
1. Manufacturers:
a. Lawler Manufacturing Company, Inc.
b. Leonard Valve Company.
c. Powers, a Watts brand.
2. Point-of-Use Mixing Valve: Limits hot water temperatures to end-use fixtures, such as sinks, bidets, lavatories, and bathtubs.
a. ASSE 1070, thermostatically controlled, water tempering valve.
b. Vandal resistant, locking temperature adjustment.
c. Cast brass body and corrosion-resistant internal components.
d. Integral check valves with stainless steel screens on hot and cold inlets.

2.09 TRAP SEAL PRIMER VALVES

A. Manufacturers:
1. Josam Co.
2. MIFAB
3. Precision Plumbing Products, Inc.
4. Smith, Jay R. Mfg. Co.
5. Sioux Chief Manufacturing Co.
6. Watts Industries, Inc.

B. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:
1. 125-psig minimum working pressure.
2. Field serviceable.
3. Activated with a 3-psig pressure drop.
4. Bronze body with atmospheric-vented drain chamber.
5. Inlet and Outlet Connections: NPS ½threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS ½threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

C. Vacuum Breaker Type Trap Seal Primer Valves: ASSE 1044, Chrome-plated, cast-brass, NPS 1½, flushometer valve vacuum breaker with NPS ⅜ outlet tubing.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Escutcheons:
1. Install and firmly attach escutcheons at piping penetrations into finished spaces.
2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
3. Use deep-drawn, high-box type where sleeves or fittings extend beyond finished surfaces.

C. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
1. Encase exterior cleanouts in concrete flush with grade.
2. Install floor cleanouts at elevation to accommodate finished floor.

D. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
1. Pipe relief from backflow preventer to nearest drain.

E. Trap seal primers are not indicated on the Drawings. Trap seal primers shall be drainage-type used with flushometer valves. At locations remote from a flushometer valve fixture, trap seal primers shall be supply-type trap seal primer valves.

F. Locate trap seal primers in accessible locations. Where located in finished area, conceal in wall and provide access door. Install supply-type trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1% and connect to floor-drain, floor-sink, or open-hub drain or other drain body, trap, or inlet fitting. Adjust valve for proper flow.

G. Size and install water hammer arresters in accordance with manufacturer's recommendations and instructions. Install arresters at quick-closing valves, solenoid valves, and at each plumbing fixture or battery of fixtures in domestic water systems. Arrestors shall be accessible for servicing or replacement.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Tankless electric water heaters.

B. Water heaters.

C. Sanitary sewage pumps.

1.02 REFERENCE STANDARDS

A. ASHRAE Std 90.1 I-P – Energy Standard for Buildings Except Low-Rise Residential Buildings.

B. UL 174 – Standard for Household Electric Storage Tank Water Heaters.

1.03 SUBMITTALS

A. See Section 22 05 00 “Common Work Results for Plumbing” for submittal procedures.

B. Product Data:
1. Indicate pump type, capacity, power requirements.
2. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.

C. Warranty Documentation: Submit manufacturer’s warranty and ensure that forms have been completed in Owner’s name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Certifications:
1. Electric Water Heaters: UL listed and labeled to UL 174.
2. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.05 WARRANTY

A. Provide five-year manufacturer’s warranty for domestic water heaters.

PART 2 - PRODUCTS

2.01 WATER HEATERS

A. Manufacturers:
1. A.O. Smith Water Products Co.
2. Bock Water Heaters, Inc.
3. Rheem Manufacturing Company.
4. Eemax.

B. Tankless Electric Water Heater:
1. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
2. Heater Type: Self-contained, wall-mounted unit capable of handling listed capacity, water-inlet strainer, removable thermally-insulated front panel, and threaded water pipe-end connections.

3. Heater-Heat Exchanger: Stainless steel, thermally insulated and encased assembly in corrosion-resistant steel jacket; baked-on enamel finish.
4. Safeties: Provide internal safeties for water flow, electrical load, and thermal load.
5. Controls: Color touchscreen interface for internal controls; temperature range adjustable from 120°F to 170°F using flanged or screw-in nichrome elements. Wire double-element units so elements do not operate simultaneously.

2.02 SANITARY SEWAGE PUMPS

A. Manufacturers:
1. Pentair, PLC.
2. York Fluid Controls Limited.
3. Zoeller Pump Company.
4. KEEN

B. General:
1. Vortex type designed to handle fluids containing air, solids, and stringy material typically found in sewage.
2. Designed to pump solids up to 3 inches in diameter.

C. Casing:
1. Construct with tapped and plugged holes for venting, priming, and drainage of pump.
2. Casing capable of handling pressures 50 percent greater than the maximum operating pressure.
3. All internal casing clearances to be equal to the discharge nozzle diameter enabling all material to pass through the casing.
4. Connections: Flanged.
5. Impeller:
   a. Recessed design.
   b. Impeller securely keyed to the shaft with locking arrangement to prevent loosening from either reverse or forward direction.
6. Pump Shaft:
   a. Construct from high grade alloy steel.
   b. Sized to provide minimum amount of deflection.
7. Sleeve: Removable stainless steel sleeve for protection of the shaft throughout the packing area.
8. Seals: Provide stuffing box, designed for the interchangeable use of packing or mechanical seals, and suitable for the use of oil, grease, or water as the sealing liquid.
9. Packing:
   a. Packing to be readily removable from the shaft.
10. Mechanical Seals:
    a. Single type of carbon-ceramic construction.
    b. Seal interface to be held in place by its own stainless steel spring system.
    c. Seal system to be readily removable from shaft.
11. Bearings:
    a. Furnish antifriction ball type designed to carry all radial or thrust loads.
    b. Bearings to be grease lubricated and contained in dust- and moisture-proof housings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer’s instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.

C. Domestic Water Storage Tanks:
   1. Provide steel pipe support, independent of building structural framing members.
   2. Clean and flush prior to delivery to site. Seal until pipe connections are made.

D. Pumps:
   1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25% of midpoint of published maximum efficiency curve.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Water Closets.

B. Urinals.

C. Lavatories.

D. Sinks.

E. Bottle filling stations.

1.02 REFERENCE STANDARDS

A. ADA Standards – 2010 ADA Standards for Accessible Design.

B. ASME A112.6.1M – Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use.

C. ASME A112.18.1 – Plumbing Supply Fittings.

D. ASME A112.18.9 – Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures.

E. ASME A112.19.2 – Ceramic Plumbing Fixtures.

F. ASME A112.19.3 – Stainless Steel Plumbing Fixtures.

G. ASME A112.19.5 – Flush Valves and Spuds for Water Closets, Urinals, and Tanks.

H. ASSE 1070 – Performance Requirements for Water Temperature Limiting Devices.

I. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

J. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

K. IAPMO Z124 – Plastic Plumbing Fixtures.

L. ICC A117.1 – Accessible and Usable Buildings and Facilities.

M. NSF 61 – Drinking Water System Components – Health Effects.

N. NSF 372 – Drinking Water System Components – Lead Content.

1.03 SUBMITTALS

A. See Section 22 05 00 – Common Work Results for Plumbing for submittal procedures.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

C. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or comparable model of the same manufacturer, or comparable product of one of the listed manufacturers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.06 WARRANTY

A. See Section 01 78 00 – Closeout Submittals for additional warranty requirements.

B. Provide five-year manufacturer's warranty for electric water cooler.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 WATER CLOSETS

A. Manufacturers:
1. American Standard, Inc.
2. Acorn Engineering
3. Kohler Company.
4. Zurn Industries, LLC.

B. Flush Valve Water Closets: White vitreous china, ASME A112.19.2, floor mounted, siphon jet flush action, china bolt caps.

2.03 TOILET SEATS

A. Manufacturers:
1. American Standard, Inc.
2. Acorn Engineering
3. Church Seat Company.
4. Olsonite.
5. Zurn Industries, LLC.

B. Solid white plastic, open front, extended back, self-sustaining hinge, corrosion bolts, without cover.

2.04 URINALS

A. Manufacturers:

1. American Standard, Inc.
2. Acorn Engineering
3. Kohler Company.
4. Zurn Industries, LLC.

2.05 FLUSH VALVES

A. Manufacturers:
1. American Standard, Inc.
2. Delany Products.
3. Sloan Valve Company.
4. Zurn Industries, LLC.

B. Flush Valves:
1. Type: ASME A112.19.5; chloramine-resistant, clog-resistant dual-seat diaphragm valve complete with vacuum breaker stops and accessories.
2. Sensor Operated: Solenoid-operated piston or electronic motor-actuated operator with battery-powered infrared sensor, and mechanical override or override pushbutton.

2.06 FIXTURE CARRIERS

A. Manufacturers:
1. Jay R. Smith MFG. Co.
2. JOSAM Company.
3. MIFAB, Inc.
4. Acorn Engineering
5. Zurn Industries, LLC.

B. Water Closet Carriers: ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

C. Urinal Carriers: ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

D. Lavatory Carriers: ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, concealed arm supports, bearing plate and studs.

2.07 LAVATORIES

A. Manufacturers:
1. American Standard, Inc.
2. Gerber Plumbing Fixtures LLC.
3. Kohler Company.
4. Zurn Industries, LLC.

2.08 LAVATORY FAUCETS

A. Manufacturers:
1. American Standard, Inc.
2. The Chicago Faucet Company.
3. Acorn Engineering
4. Kohler Company.
5. Sloan Valve Company.
6. T&S Brass and Bronze Works, Inc.

7. Zurn Industries, LLC.

B. Manual Faucet: ASME A112.18.1; chrome-plated combination supply fitting with pop-up waste, indexed handles.

C. Supply Faucet: ASME A112.18.1; chrome-plated supply fitting with single lever handle.

D. Sensor-Operated Faucet: ASME A112.18.1; chrome-plated metered mixing faucet with battery-operated solenoid operator and infrared sensor, aerator, and cover plate.

2.09 THERMOSTATIC MIXING VALVES

A. Manufacturers:
1. Acorn Engineering Company.
2. Leonard Valve Company.
3. Powers, A Watts Brand.
4. Symmons Industries, Inc.
5. Watts.
6. Zurn Industries, Inc.

B. Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with combination stop, strainer, and check valves, and flexible stainless-steel connectors.

2.10 UNDER-LAVATORY PIPE SUPPLY COVERS

A. Manufacturers:
1. Oatey.
2. Plumberex Specialty Products, Inc.
3. Truebro, IPS Corporation.

B. General:
1. Insulate exposed drainage piping including hot, cold, and tempered water supplies under lavatories or sinks per ADA Standards.
2. Construction: ⅛-inch PVC with antimicrobial-, antifungal- and UV-resistant properties.
a. Comply with ASTM E84 for flame and smoke development.
b. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
c. Microbial and Fungal Resistance for Interior and Exterior: Comply with ASTM G21.
3. Color: High gloss white.
4. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces. No cable ties allowed.

2.11 LAVATORY ACCESSORIES

A. Chrome-plated 17-gauge, 0.0538-inch brass P-trap with cleanout plug and arm with escutcheon.

B. Offset waste with perforated open strainer.

C. Wheel handle stops.

D. Flexible supplies.

2.12 SINKS

A. Manufacturers:

1. American Standard, Inc.
2. Elkay Manufacturing, Co.
3. Acorn Engineering
4. Kohler Company.

B. Single Compartment Bowl
   1. ASME A112.19.3; 18 gauge, 0.0500-inch-thick, Type 304 stainless steel, self-rimming and undercoated, with ledge back drilled for trim.

C. Double Compartment Bowl:
   1. ASME A112.19.3; 18-gauge, 0.0500-inch-thick, Type 304 stainless steel, self- rimming and undercoated, with ledge back drilled for trim.

2.13 BOTTLE FILLING STATIONS

A. Manufacturers:
   1. Elkay Manufacturing Company.
   2. Haws Corporation.
   3. Murdock Manufacturing, Inc.
   4. Oasis International.

B. Bottle Filler:
   1. Non-refrigerated, electronic bottle filler.
   2. Materials: Stainless steel cabinet with plastic face plate.
   3. Silver ion antimicrobial protection on key plastic components.
   4. Surface mount, wall mount assembly.
   5. Laminar flow filler.
   6. Lead-free waterways.
   7. Hands free operation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for the specific fixtures.

3.03 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

3.04 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.05 CLEANING

A. Clean plumbing fixtures and equipment.

3.06 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Do not permit use of fixtures by construction personnel.

C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

DIVISION 26
ELECTRICAL

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 general electrical requirements for all Divisions 26, 27, and 28 work and is supplemental and in addition to the requirements of Division 01.

B. Section Includes:

1. Electrical equipment coordination and installation.
2. Common electrical installation requirements.

C. General Requirements: Conform to Contract Documents. This section is supplemental and in addition to requirements of Division 01.

D. Conditions and Requirements: Conditions and requirements of the General Provisions, Supplemental General provisions and Special Provisions are hereby made a part of the Electrical Division of this Specification. If requirements disagree, the more stringent requirement will become the contractual obligation.

E. Provide a complete working installation with all equipment called for in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or specified is clearly necessary for proper operation of equipment shown or specified, provide an item which will allow the system to function at no increase in Contract Sum.

F. Workmanship shall be of the best quality and competent and experienced electricians shall be employed and shall be under the supervision of a competent and experienced foreman.

G. The drawings and specifications are complimentary and what is called for (or shown) in either is required to be provided as if called for in both.

1.3 DEFINITIONS

A. Definitions of all terms shall be in accordance with applicable definitions of:

1. AIA - American Institute of Architects
2. IEEE - Institute of Electrical and Electronic Engineers
3. IES - Illuminating Engineering Society
4. NEMA - National Electrical Manufacturers Association
5. NEC - National Electrical Code
6. IBC - International Building Code

7. IFC - International Fire Code
8. ADA - Americans with Disabilities Act
9. NFPA - National Fire Protection Association

1.4 CODES

A. Codes for installation of electrical work shall be State of Washington Electrical Code, Electrical Safety Code, applicable rules and regulations and OSHA and Washington Industrial Safety and Health Act. Any violation of the above Safety Codes shall be cause for immediate termination of Contractor's authority to proceed with work, and recourse to surety for completion of the project.

1.5 PERMITS AND INSPECTIONS

A. Obtain permits and pay fees required by governmental agencies having jurisdiction over this work.

B. Submit electrical plans to City of Seattle for electrical plan review. Pay electrical plan review fee. If necessary, obtain conduit only permit to allow electrical work to begin while plan review is underway.

C. Arrange for inspections required during construction. On completion of work, furnish satisfactory evidence to show all work installed in accordance with codes.

1.6 CLEARANCES

A. Adequate working space shall be provided around electrical equipment for maintenance and operation. Minimum clearances shall conform to Art. 110-26 of N.E. Code.

1.7 TESTS

A. Test all wiring and connections for continuity and grounds before any fixtures or equipment are connected, and run a Megger test. Where such tests indicate faulty insulation or other defects, all such defects and faults shall be located, repaired and tested again.

B. Make check of proper load balance on 3-wire system and on phases of 3-phase system. Check direction of rotation and lubrication on all motors after final service connections have been made.

1.8 INDUSTRY STANDARDS, CODES AND SPECIFICATIONS

A. All materials, equipment, and systems shall conform to the following applicable Industry Standards, Codes and Specifications:

1. ANSI - American National Standards Institute
2. IEEE - Institute of Electrical and Electronic Engineers
3. IES - Illuminating Engineering Society
4. IPCEA - Insulated Power Cable Engineers Association
5. NFPA - National Fire Protection Association

6. NEMA - National Electrical Manufacturers Association
7. UL - Underwriters Laboratory
8. IBC - International Building Code
9. IFC - International Fire Code
10. IMC - International Mechanical Code
11. ADA - Americans with Disabilities Act (Washington State ADA/WAC51-30)
12. WAC - Washington Administrative Code
13. NEC - National Electrical Code

B. Where differences occur between state laws, local ordinances, industry standards, utility company regulations and the Contract Documents, the most stringent shall govern.

1.9 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Nothing in the Drawings or Specifications shall be construed to permit Work not conforming to applicable laws, ordinances, rules or regulations.
2. When Drawings or Specifications exceed requirements of applicable laws, ordinances, rules, or regulations, comply with documents establishing the more stringent requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Ship equipment in its original package to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturer's recommendations. Provide protective coverings during construction.

B. Identify materials and equipment delivered to the Site to permit check against approved materials list, and reviewed submittals.

1.11 PROJECT CONDITIONS

A. Equipment Rough-In:

1. Rough-in locations for equipment furnished under other Divisions and for equipment furnished by Owner are approximate only. Obtain exact rough-in locations from the following sources:
   a. From Shop Drawings for Contractor provided equipment.
   b. From Architect for Owner furnished, Contractor installed equipment.

1.12 MATERIAL AND EQUIPMENT ENVIRONMENT

A. All equipment and material shall be suitable for the environment of the installation, and the installation including equipment shall satisfy the governmental agencies having jurisdiction

1.13 DRAWINGS AND SPECIFICATIONS

A. Specifications, with drawings, are intended to cover installation of all electrical equipment. Materials shown and called for on drawings, but not mentioned in specifications, or vice versa, necessary for proper completion and operation of equipment, shall be furnished the same as if called for in both.

B. Electrical drawings do not attempt to show complete details of project construction which affect electrical installations. Refer to architectural, structural and mechanical drawings for additional details which affect installation of this work.

1.14 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

E. Before installation Contractor shall make proper provisions for electrical work and to avoid interferences with installation of other work. Any changes caused by neglect to do so shall be made at Contractor’s expense.

F. Electrical drawings and specifications shall be compared with drawings and specifications of other trades and any discrepancies between them reported to the Architect prior to installation of work.

G. Coordinate and arrange work so there is no interference between wiring outlets, lighting fixtures, and raceways with sheet metal work, insert hangers, mechanical piping, and structural members.

1.15 CUTTING AND PATCHING

A. Do all cutting and patching for installation of the work. All cutting done carefully to prevent damage to work of other trades, and all patching done by mechanics skilled in the trade

affected, and subject to approval by Architect. Provide all work per Division 01. Work shall include:

1. All openings for removed equipment shall be patched or entire system replaced. No openings shall remain at completion of work.
2. Exterior cutting and patching shall be done by qualified Contractors. Patching of asphalt and concrete shall be per Division 01 and approved by Civil Engineers and Architect. Grass and earth patching, seeding, and sod work shall be per Division 01 and approved by the Landscaper, Civil Engineer, and Architect. All backfill per Division 01.
3. Painting: All exposed conduit, boxes, surface metal raceway, enclosures, multi-outlet assemblies shall be painted to match wall color. Where exact color unknown, coordinate with Architect to obtain color. All items shall be painted regardless of whether wall, ceiling, floor finish is painted.

1.16 RUBBISH AND CLEAN-UP

A. Contractor shall promptly remove waste material and rubbish caused by workers.

B. At completion of work, clean all fixtures, electrical panel interiors, switchboards, distribution centers, and all other equipment installed.

1.17 SCOPE OF WORK

A. Mention herein or indication on drawings of articles, materials, operations or methods, requires that Contractor provide each item mentioned or indicated, of quality, or subject to qualifications noted; perform according to conditions stated, each operation prescribed.

B. Work included under this contract provides for all labor, equipment, and materials to complete all electrical work as outlined in drawings and specifications for project.

C. The scope of this work is listed generally but is not limited to as follows:

1. Lighting System and fixtures
2. Panelboards
3. Branch wiring, power, lighting, and equipment
4. Equipment connections
5. New power service

1.18 SUBMITTALS

A. General:

1. Submittals shall be in accordance with requirements of Division 01 and as specified.
2. Forward all submittals to the Architect, together, at one time. Individual or incomplete submittals are not acceptable.
3. Organize submittals in same sequence as they appear in Specification Sections.
4. Identify each submittal item by reference to Specification Section paragraph in which item is specified, or Drawing and Detail number.

5. Identify each item by manufacturer, brand, trade name, number, size, rating, or whatever other data is necessary to properly identify and review materials and equipment. Words ″as specified″ are not sufficient identification.

B. Shop Drawings:

1. Show physical arrangement, construction details, finishes, materials used in fabrication, provisions for conduit entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and weights.
2. Catalog cuts and published material may be included to supplement Shop Drawings.

C. Contract Closeout Submittals:

1. Operation and Maintenance:
   a. Subsequent to final completion, and testing operations, instruct Owner's authorized representatives in operation, adjustment, and maintenance of electrical plant.
   b. Before Owner's personnel assume operation of systems, submit operating and maintenance instructions, manuals, parts lists on electrical plant, its component parts, including all equipment which requires, or for which the manufacturer recommends, maintenance in a specified manner. Data sheets shall show complete internal electrical wiring, ratings, and characteristics, catalog data on components parts whether furnished by equipment manufacturer or others, names, addresses, and telephone numbers of source of supply for parts subject to wear or electrical failure, and description of operating, test, adjustment, and maintenance procedures.

D. Submit the equipment list to the Architect for final review. This list shall consist of, but not be limited to, the basic items applicable to the project as follows:

1. Lighting System and fixtures
2. Panelboards
3. Branch wiring, power, lighting, and equipment
4. Conduit and Fittings

1.19 ELECTRICAL EQUIPMENT MAINTENANCE MANUALS

A. The Electrical Contractor shall prepare maintenance manuals for the servicing of all equipment installed as a part of the construction contract.

B. The information contained in the manuals shall be grouped in an orderly arrangement under basic categories, i.e., Secondary Systems Equipment, Special Raceways, Motors & Controls, Lighting Equipment, etc.

1.20 JOB RECORD INFORMATION

A. Record drawings shall be continuously maintained in the field by the Contractor. Drawings used for this purpose shall be the latest revision and shall be kept neat and clean.

B. Drawings shall include dimensions on all underground conduit.

1.21 NAMEPLATES AND TAGS IN ADDITION TO 260553

A. The following items shall be equipped with tags or nameplates with etched letters:

1. All motors, transformers, motor starters, pushbutton stations, control panels and time switches.
2. Disconnect switches, fused or unfused; switchboards and panelboards; circuit breakers, contactors or relays in separate enclosures.
3. Wall switches controlling outlets, or equipment where the outlets are not located within sight of the controlling switch. All low voltage lighting switches.
4. Special electrical systems shall be properly identified at junction and pull boxes, terminal cabinets and equipment racks.
5. Label all junction boxes with pen indicating type of system (i.e. Power, Data, etc.), circuit voltage, panel and circuit number and switch leg.
6. Paint all junction boxes with the following color code.

   Normal 120/208 White

7. Tags shall adequately describe the function of, or use of, the particular equipment involved. Tags for panelboards and switchboards shall include the panel designation, voltage and phase of the supply. For example, “Panel A, 208V/120V.” The name of the machine shall be the same as the one used on all motor starter, disconnect and P.B. station tags for that machine.
8. Tags for 120/208 volts shall be laminated phenolic plastic with white engraved letters on black background. Tags for emergency systems identification shall be red with white lettering. Lettering shall be 3/16” high at pushbutton stations, thermal overload switches, receptacles, wall switches and similar devices, where the tag is attached to the device plate. All other locations, lettering shall be 1/4” high, unless otherwise detailed on the drawings. Tags shall be securely fastened to the equipment with screws or brass bolts. Contact cement is approved in dry locations. All tags and their installation are a part of this work.

1.22 FINAL SUBMITTALS

A. After completion of all electrical work and prior to final inspection, submit the following:

1. Letter addressed to Engineer, stating that Contractor, or superintendent in charge of job, has personally made a complete inspection of the job; that those items found to be defective in material or workmanship or not in conformance with drawings and specifications have been corrected; and that entire electrical job is ready for final observation by Engineer.
2. One copy of the electrical equipment maintenance manual to be sent direct to Engineer for review, containing the following:
   a. Letter of transmittal, addressed to Engineer, containing a list of suppliers of replacement parts for all electrical equipment used on job.

b. Panel, switchboard, and control drawings corrected to agree with Engineer's notations.
c. Catalog cuts of all lighting fixtures, lamps, transformers, starters, special devices, door control system, and all other equipment used on job.
d. All available maintenance data published.
e. Wiring diagrams and operating instructions for all systems installed.
f. Marked-up set of prints showing exact location of all conduits and outlets deviating from original plans. Purchase prints new for this purpose. Prints not required to be bound in maintenance manual.
g. Signed receipts for all loose items i.e. keys, instructions and guarantee, etc.

3. Refer to Division 01 for Operations and Maintenance Manuals.

1.23 WARRANTY

A. Warranties shall be provided per Division 01. Where not indicated provide minimum 1 year (or standard manufacturer's warranty if longer) warranty for all equipment installed on this project. Warranty shall include all labor, site visit, installation costs.

1.24 PAY REQUEST SUBMITTALS

A. In addition to the requirements of other Divisions of the Specifications, provide substantiating data for Architect's review.

1.25 MOUNTING HEIGHTS

A.	Convenience outlets	18" AFF unless noted otherwise
B.	Wall Switches	4'-0" to top above floor

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and Equipment General Requirements:

1. All items of materials in each category of equipment shall be of one manufacturer.
2. Groups of items having same or similar function shall be by single manufacturer to facilitate maintenance and service.
3. Compatible with space allocated. Modifications necessary to adjust items to space limitations shall be at Contractor's expense.
4. Conform with conditions shown and specified. Coordinate with other trades for best possible assembly of completed Work.
5. Install fully operating without objectionable noise or vibration.

B. Access Doors:

1. Furnish under this Division where shown, required by regulatory agencies, and for access to all concealed electrical items requiring access. Access doors shall be in accordance with requirements of Division 08. Doors in this Division, Division 08, and Division 15 shall be from the same manufacturer for identical appearance and keying. Furnish fire rated doors where required. Deliver access doors for installation under Division 08. Mark each access door to accurately establish its location.

C. Firestopping and Smokestopping: Provide in accordance with Division 07.

1. Provide firestopping where wiring, conduit, or cable tray penetrates fire wall or floor.
2. Provide smokestopping where wiring, conduit, or cable tray penetrates smoke barrier.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mounting Heights: To center of device unless noted:

1. Convenience outlets ----------18" AFF unless noted otherwise
2. Wall Switches ----------4’-0" to top above floor

B. Follow manufacturer’s directions in all cases where manufacturers of articles used furnish directions covering points not shown or specified.

C. Accurately set and level equipment with supports neatly placed and properly fastened. No allowance of any kind will be made for negligence on the part of the Contractor to foresee means of bringing in and installing equipment in position inside the building.

D. Conduit System:

1. Work into complete integrated arrangement with like elements. Make work neat and finished appearing.
2. Run concealed, except where shown otherwise. Where exposed run parallel with walls or structural elements with vertical runs plumb, horizontal runs level; groups racked together neatly with bends parallel and uniformly spaced. On existing walls run exposed using surface metal raceway.
3. Flash and counterflash all penetrations through roof in accordance with requirements of Division 07 and as shown.

E. Provide hangers, supports, anchors and chases as required for installation of Electrical Work.

F. Interface with other products:

1. For purposes of clarity and legibility, Drawings are essentially diagrammatic to the extent that many offsets, bends, special fittings, and exact locations of items are not indicated, unless specifically dimensioned. Exact routing of wiring, and locations of outlets, panels, and other items shall be governed by structural conditions or obstructions. Contractor shall make use of data in Contract Documents. In addition, Architect reserves right, at no

increase in Contract Sum, to make any reasonable change in location of electrical items exposed at ceilings or on partitions to group them in orderly relationships or to increase their utility. Verify requirements in this regard prior to roughing-in.

2. Take dimensions, location of doors, partitions, and similar features from Architectural Drawings. Verify at the Site under this Division. Consult Architectural Drawings for exact location of outlets, and other items to center with architectural features. Coordinate location of all ceiling mounted items with Division 09.

3.2 FIELD QUALITY CONTROL

A. Test panels and circuits for grounds and shorts with mains disconnected from feeders, branch circuits connected, and circuit breakers closed, all fixtures in place, permanently connected, grounding jumper to neutral lifted, and with all wall switches closed.

3.3 CLEANING

A. Properly prepare Work under this Division to be finish painted under Division 01.

3.4 EQUIPMENT IDENTIFICATION

A. Properly identify panelboards, circuit breakers in panelboards, disconnect switches, starters, and other apparatus used for operation or control of circuits, appliances or equipment.

3.5 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope

3.6 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION

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. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.5 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.

5. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70. Minimum size - No. 12 AWG. Stranded for sizes No. 8 and larger, solid for No. 10 and No. 12.

C. Aluminum: Not permitted.

D. Conductor Insulation: Comply with NEMA WC 70. Drawings are based on using THHN-THWN cables. Contractor shall increase conduit size for any other insulation.

E. Ground Wire: Provide THWN ground wire in all circuits, sized per code. Raceway shall not be used as ground.

F. Control and Low Voltage Cable: Cable shall be as recommended by manufacturer. Contractor shall coordinate location of plenums in building with all other trades. Provide plenum rated cable whenever cable passes through a plenum for the entire length.

2.2 CONNECTORS AND SPLICES

A. Splices and Terminations

1. 600 Volt
   a. Splices: Solderless type only. Pre-insulated "twist-on" type permitted on solid conductor size number 10 and smaller. Hydraulic compression long barrel type with application preformed insulated cover, heat shrinkable tubing or plastic insulated tape for all stranded conductors. For stranded conductors provide terminations designed for use with stranded conductors.
   b. Terminations: 250 kcmil and above – two-hole long barrel compression lugs. Below 250 kcmil – single-hole compression lug. Conductors No. 12 and smaller: provide eye or forked tongue compression lugs at bolted or screw connections - no lugs required for compression style terminal blocks.
   c. Cable Ties: Nylon or accepted, locking type. Use a torque limiting tool for installation of ties.

2. Control Cable Splices and Terminations
   a. Splices: Pre-insulated crimp pigtail or butt splice connectors.
   b. Terminations: Locking spade, insulated, compression lugs.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Submit schedule of proposed aluminum wire for review. Contractor to increase conduit size to accommodate aluminum wire.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Type THHN-THWN, single conductors in raceway.

B. Branch Circuits: Type THHN-THWN, single conductors in raceway.

C. Class 1 Control Circuits: Type THHN-THWN, in raceway.

D. Class 2 Control and Low Voltage Circuits: Type THHN-THWN, in raceway, or as required by manufacturer. Plenum rated where required. Cable shall not be installed in slab or underground. All circuits shall be installed in raceway when installed in walls and non-accessible spaces.

3.3 BRANCH WIRING

A. General: Complete system of conduit required to all light outlets, receptacles, switches, etc. as shown. Conduit size as shown on drawings, except where no size is shown, conduit shall be sized per National Electrical Code. No conduit shall carry more than 8 conductors. All exposed switches, receptacles or outlet boxes for other purposes, install die cast boxes, except where specifically noted otherwise. Feeder cables shall have each phase identified according to the established code.

B. Coding: Branch circuit color code shall be: For 120/208 V. Black – Phase A, Red – Phase B, Blue – Phase C, White – Neutral, Green – Ground, Purple “Travellers” on 3 and 4 way switching. Where colors are not available (No. 4 and larger) all terminals shall be coded, both on the wire and on the terminal. Phase and neutral wires shall appear in the same position and rotation at all appearances.

C. Separate neutrals shall be provided for all branch circuits. Shared neutrals are not allowed.

3.4 EQUIPMENT WIRING

A. General: Wiring connections for power and control for all equipment shall be complete including disconnect switches and controls unless otherwise specified or noted on drawings.

B. Control wiring for mechanical systems installed under this section of specifications shall be in accordance with mechanical drawings and specifications.

3.5 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in raceway in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

D. Exposed cables not permitted.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.6 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and branch conductors for compliance with requirements.
   a. Megger Test
2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes methods and materials for grounding.

1.2 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Insulated Ground Conductors: Per 260519.

D. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 3/0 AWG minimum.

1. Bury at least 24 inches below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.

C. Equipment Ground Conductors: Green colored insulation. Provide in all raceways.

D. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

E. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

F. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors or exothermic weld where required by code authority.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

C. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

D. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

E. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet of bare copper conductor not smaller than No. 3/0 AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.

F. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

G. Separately Derived Systems (Transformers): Bond to structural steel, main waterpipe within five feet of waterpipe entry to building, or building grounding electrode.

H. Consult with code authority and comply with all code authority requirements.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.2 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

D. IBC: International Building Code

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

E. All supports shall comply with IBC, Washington Seismic Zone, Building Use Group III.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. Cooper B-Line, Inc.; a division of Cooper Industries.
   c. ERICO International Corporation.
   d. GS Metals Corp.
   e. Thomas & Betts Corporation.
   f. Unistrut; Tyco International, Ltd.
   g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Not permitted.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

D. Secure raceways and cables to these supports with two-bolt conduit clamps.

E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

J. RGS: Rigid galvanized steel

K. PVC: Polyvinyl Chloride

1.3 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For handholes and boxes for underground wiring, including the following:
    a. Duct entry provisions, including locations and duct sizes.
    b. Frame and cover design.
    c. Grounding details.
    d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
    e. Joint details.

C. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For professional engineer and testing agency.

E. Source quality-control test reports.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: Not permitted.

D. IMC: ANSI C80.6.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

F. EMT: ANSI C80.3. Hot dipped galvanized inside and outside.

G. FMC: Aluminum.

H. LFMC: Flexible steel conduit with PVC jacket.

I. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel, compression or set screw type.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

K. MC Cable: UL listed, copper cabling with ground wire and multiple circuits or neutrals as shown on the drawings. Aluminum or steel cladding, #12 copper minimum wire size

2.2 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. ENT: NEMA TC 13. Not permitted

C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated as PVC 80.

D. LFNC: Not permitted.

E. Fittings for Elbows and Sweeps shall be plastic coated rigid galvanized steel RNC: NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: Not permitted.

2.3 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 or 3R when outside, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1. Minimum size: 4-inch by 4-inch by 1 ½-inch. Voice/data/AV boxes minimum 2 1/8-inch deep.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: Not permitted.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

H. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.5 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water-stop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.6 SLEEVE SEALS

A. Basis-of-Design Product:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Carbon steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
2. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.
3. Where not shown handholes are Utility Vault#444LA with 44-332P H20 rated cover.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: Rigid steel conduit, IMC.
3. Underground Conduit: Branch Circuitry Underground is not permitted except for runs installed on exterior or corridor walls. All other branch circuitry shall be run overhead or in walls RNC, Type EPC-40-PVC, direct buried with plastic coated RGS bends and sweeps. See underground section.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
   a. Loading dock.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

3. Concealed in Ceilings and Interior Walls and Partitions: EMT. MC cable permitted in walls in room for branch circuiting only. ~~No~~ MC cable permitted for homeruns or connections between rooms when concealed.
4. In Slab or underground Conduit: Branch Circuitry Underground is not permitted except for runs installed on exterior or corridor walls. All other branch circuitry shall be run overhead or in walls RNC, Type EPC-40-PVC, direct buried with plastic coated RGS bends and sweeps. Branch Circuitry in second floor slab is not permitted except for runs installed on exterior or corridor walls and only where approved by structural engineer. All other branch circuitry shall be run overhead or in walls.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: Rigid steel conduit.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

D. Communications and Electronic Safety and Security: Shall be EMT overhead. Underground is not permitted except for connections between MDF and IDF's. See 260534.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

G. No conduit shall contain more than 3 conductors plus neutrals and ground unless permitted or shown explicitly on drawings.

3.2 INSTALLATION

A. Raceway Sizes: When raceway is used all homeruns shall be minimum 1", branch circuitry ¾" minimum, runs that end in a single device may be ½". Note: where MC cable is acceptable these minimums do not apply.

B. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Complete raceway installation before starting conductor installation.

E. Support raceways as specified in Division 26 Section "Hangers, Supports and Fasteners."

F. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

G. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

H. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

I. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from RNC Type EPC-40-PVC to plastic coated rigid steel conduit or EMT before rising above the floor.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.

c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
d. Attics: 135 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC in damp or wet locations not subject to severe physical damage.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

3.3 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes and boxes with bottom below the frost line.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.5 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.7 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

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. Identification for raceway.
2. Identification for conductors and communication and control cable.
3. Underground-line warning tape.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and ANSI C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Color for Printed Legend:

1. Power: White letters on a black field.
2. Emergency Power: Black on red as dictated by inspector
3. Fire Alarm: White on red.
4. Legend: Indicate system or service and voltage, if applicable.

C. Self-Adhesive Labels: Preprinted, laminated hard label with a clear, weather- and chemical-resistant coating.

D. Snap-Around Labels for conduit: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.

D. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking nylon tie fastener.

E. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, Engraved, Laminated Acrylic or Melamine Label, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated. Minimum size = 1/4”.

C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.4 EQUIPMENT IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with letters per above. Minimum letter height shall be 3/8 inch.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb, minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. Junction Boxes: All junction boxes shall be painted per the following color code and 260500:

1. Fire Alarm: Red
2. Data/Phone: Blue

C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

2.6 PANEL DIRECTORIES

A. Directory: Provide typewritten circuit directory on the inside of each panel door under plastic cover, identifying the type and location of every load. At lighting and receptacle circuits, indicate room numbers and names. All room numbers shall be as furnished by the Owner. All replaced or modified panels shall be provided with new directories.

B. Identification: Spare circuits will be identified as such in pencil. Permanent room numbers, as furnished by owner, shall be used for location identification.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label or snap-around label or self-adhesive vinyl tape applied in bands.

B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands or snap-around, color-coding bands:

1. Fire Alarm System: Red.
2. Fire-Suppression Supervisory and Control System: Red and yellow.
3. Telecommunication System: Blue.
4. Control Wiring: Green and red.

C. Power-Circuit Conductor Identification: For primary and secondary conductors No. 4 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

D. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use aluminum wraparound marker labels. Identify each ungrounded conductor according to source and circuit number.

E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source and circuit number.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
   a. Power transfer switches.
   b. Controls with external control power connections.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

H. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer and load shedding.

I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
   a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label. Stenciled legend 4 inches high.
   c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:
   a. Panelboards, electrical cabinets, and enclosures.
   b. Access doors and panels for concealed electrical items.
   c. Emergency system boxes and enclosures.

d. Motor-control
e. Disconnect switches.
f. Enclosed circuit breakers.
g. Motor starters.
h. Push-button stations.
i. Contactors.
j. Remote-controlled switches, dimmer modules, and control devices.
k. Voice and data cable terminal equipment rough in
l. Fire-alarm control panel and annunciators.
m. Monitoring and control equipment.
n. Junction boxes: System, voltage and circuit with black pen.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded conductors.

1. Color shall be factory applied.
2. Colors for 208/120-V Circuits:
   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White

3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. System coordination study for normal systems.
2. Short circuit study for normal
3. Protective device calibration and setting to achieve coordination.
4. Arc fault study per NEC 70E or entire system. Provide an Arc Flash Hazard Study for the electrical distribution system shown on the one-line drawings. The intent of the Arc Flash Hazard Study is to determine hazards that exist at each major piece of electrical equipment shown on the one-line drawings. This includes switchgear, switchboards, panelboards, motor control centers, automatic transfer switches, VFD's, and transformers. The study will include creation of Arc Flash Hazard warning labels. These labels serve as a guide to assist technicians and others in the selection of proper personal protective equipment when working around exposed and energized conductors. Electrical contractor shall install the labels.
5. Contractor shall provide all changes including transformers, fuses, wire size and conduit size changes required by the coordination engineer.

1.2 SCOPE

A. It is the intent of these tests to assure that protective devices are operational, correctly applied, within industry and manufacturer's tolerances, and installed in accordance with the specifications. This effort should minimize the damage caused by any electrical failure. The testing agency shall verify that the electrical system and electrical equipment configuration matches the contract documents, vendor shop drawings, and the electric system coordination study recommended settings.

B. Prepare a coordination study for the specific electrical overcurrent devices and feeder lengths, to be installed under this project, from the primary overcurrent protective device to the branch circuit breaker panels to assure proper equipment and personnel protection.

C. The study shall present an organized time-current analysis of each protective device in series from the individual device back to the source at Puget Sound Energy. The study shall reflect the operation of each device during normal and abnormal current conditions, and confirm that devices are coordinated.

D. The study shall coordinate the emergency system to meet NEC 700, 701, and 702. The system shall selectively coordinate to comply with all requirements of 700.27 and 701.18. All equipment provided under Panels, Switchboards, Circuit Breakers, Fusing, Controllers, etc. shall be designed and provided by the contractor to comply with the selective coordination requirements of the code. Study shall be completed and accepted by the engineer prior to ordering any equipment.

E. Provide arc fault/flash study per NFPA 70E.

F. Study shall be stamped by the coordination study engineer with a Professional Engineer's stamp from the State of Washington

G. Report shall not be submitted until complete compliance with NEC 700.27 is complete. Contractor shall provide all devices as directed in the coordination study.

H. Coordination Study Engineer report and stamp states that the coordination engineer is stating that the system complies with NEC 700.27 and 701.18.

1.3 APPLICABLE CODES, STANDARDS AND REFERENCES

A. Inspection and tests shall be in accordance with the following codes and standards except as provided otherwise herein:

1. American National Standards Institute ANSI C2: National Electrical Safety Code
2. American Society for Testing and Materials – ASTM
3. Association of Edison Illuminating Companies – AEIC
4. Institute of Electrical and Electronic Engineers – IEEE
5. Insulated Cable Engineers Association – ICEA
6. International Electrical Testing Association NETA Maintenance Testing Specifications MTS- 1989
7. National Electrical Manufacturer's Association – NEMA
8. National Fire Protection Association – NFPA
    a. ANSI/NFPA 70: National Electrical Code
    b. ANSI/NFPA 70B: Electrical Equipment Maintenance
    c. NFPA 70E: Electrical Safety Requirements for Employee Workplaces
    d. ANSI/NFPA 78: Lightning Protection Code
    e. ANSI/NFPA 101: Life Safety Code
    f. NFPA 70E
9. Occupational Safety and Health Administration – OSHA
10. State and local codes and ordinances

1.4 SUBMITTALS

A. Submit the following in accordance with Division 01:

1. Protective equipment shop drawings with the protective device study. The one-line diagram showing available fault currents and timing of devices shall be submitted both as hard copies and as two electronic copies of Autocad drawings on Compact Disc. Two electronic copies of both the Dapper and Captor software files shall be provided on Compact Disc. An index shall be provided which cross references the file names on these disks to the specific pieces of equipment or system.
2. Certifications: Two weeks prior to final inspection, the Contractor shall deliver four copies of the following certifications to the Owner's representative:

a. That the protective devices have been adjusted and set in accordance with the approved protective device study.
b. That tests and settings have been witnessed by the Owner.
c. Report of results.

3. Short circuit study in conjunction with, and at the same time as, the submittal for Panelboards. The study shall show fault currents available at key points in the system down to a fault current of 5000A. The purpose of this submittal is to verify the fault current ratings of the panelboards.

1.5 QUALIFICATIONS

A. The coordination study shall be prepared by qualified engineers of the switchgear manufacturer or an approved consultant. Provide pertinent information required by the preparers to complete the study.

B. The short circuit study and coordination study shall be performed on the Dapper and Captor computer software packages. No substitutions.

C. Preapproved: Electrotest, Power Systems Engineering, Siemens Engineering Service Division, Square D, GE.

PART 2 - EXECUTION

2.1 REQUIREMENTS

A. The complete study shall include a system one line diagram, short circuit and ground fault analysis, and protective coordination plots.

B. One-Line Diagram:

1. Show, on the one line diagram, electrical equipment wiring to be protected by the overcurrent devices installed under this project. Clearly show, on the one line, the schematic wiring of the electrical distribution system.
2. Show reference nodes on the one line diagram referring to a formal report, to include the following specific information:
   a. X/R ratios, utility contribution, and short circuit values (asymmetric and symmetric) at the bus of the main switchboard, and all downstream equipment containing overcurrent devices.
   b. Breaker and fuse ratings.
   c. Transformer KVA and voltage ratings, percent impedance, X/R ratios, and wiring connections.
   d. Voltage at each bus.
   e. Identifications of each bus.
   f. Conduit material, feeder sizes, and length.
   g. Calculated short circuit current.

C. Short Circuit Study:

1. Determine the available 3 phase short circuit and ground fault currents at each bus. Incorporate the motor contribution in determining the momentary and interrupting ratings of the protective devices.
2. The study shall be calculated by means of the Dapper computer software package. Pertinent data and the rationale employed in developing the calculations shall be incorporated in the introductory remarks of the study.
3. Present the data determined by the short circuit study in a table or report format. Include:
   a. Device identification.
   b. Operating voltage.
   c. Protective device.
   d. Device rating.
   e. Calculated 3 phase short circuit current (asymmetrical and symmetrical), and ground fault current.

D. Coordination Curves:

1. Prepare the coordination curves to determine the required settings of protective devices to assure selective coordination. Graphically illustrate on log-log paper that adequate time separation exists between existing and supplied series devices. Plot the specific time-current characteristics of each protective device in such a manner that all upstream devices will be clearly depicted on one sheet.
2. The following specific information shall also be shown on the coordination curves:
   a. Device identifications.
   b. Time and current ratio for curves.
   c. ANSI damage points for each transformer.
   d. Complete fuse curves.
   e. Cable damage curves.
   f. Transformer inrush points.
   g. Maximum short circuit cutoff point.

3. Develop a table to summarize the settings selected for the protective devices. Include in the table the following:
   a. Device identification.
   b. Tap, time delay, and instantaneous pickup.
   c. Circuit breaker sensor rating, long-time, short-time, and instantaneous settings, and time bands.
   d. Fuse rating and type.
   e. Ground fault pickup and time delay.

4. Provide electronic copies of the Captor Data files on two Compact Discs. Provide a cross reference between the data file names and the hard copy tables and reports.

2.2 ANALYSIS

A. Analyze the short circuit calculations, and highlight any equipment that is determined to be underrated as specified or not coordinated. Propose approaches to effectively protect the

underrated equipment. Proposed major corrective modifications will be taken under advisement by the Owner and further instructions will be given.

B. After developing the coordination curves, highlight areas lacking coordination. Present a technical evaluation with a discussion of the logical compromises for best coordination.

2.3 ADJUSTMENTS, SETTINGS AND MODIFICATIONS

A. Accomplish necessary field settings, adjustments and minor modifications to conform with the study without additional cost to the Owner. (Examples of minor modifications are trip sizes within the same frame, the time curve characteristics of induction relays, ranges etc.)

2.4 FIELD INFORMATION

A. Gather field information needed for the protective device study.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Panelboard - Furnish and install lighting and appliance panelboard(s) as specified herein and where shown on the associated drawings.

B. Contractor shall note that drawings show shared neutrals for circuits. Contractor shall comply with NEC 210.4B, which requires either separate neutrals or a disconnecting means that disconnects all ungrounded conductors at the point where the circuit originates. This requires the contractor to provide breaker ties or 3 pole breakers for all groups of 3 circuits run with shared neutral in the field as grouping is frequently changed. Contractor shall include this in the contract. No additional payments will be made for this code requirement.

C. See section 260573 for protective device coordination study requirements. All equipment specified herein shall comply with the requirements of 260573. All equipment shall be increased in size, electronic trip added, wire and conduit size increased as require to provide a complete selectively coordinated system. Nothing in the following specification relieves the contractor from providing a complete selectively coordinated system. Fuses shall not be used to provide selective coordination

1.2 REFERENCES

A. The panelboard(s) and circuit breaker(s) referenced herein are designed and manufactured according to the latest revision of the following specifications:

1. NEMA PB 1 – Panelboards
2. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
3. NEMA AB 1 - Molded Case Circuit Breakers
4. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
5. UL 50 - Enclosures for Electrical Equipment
6. UL 67 – Panelboards
7. UL 98 - Enclosed and Dead-front Switches
8. UL 489 - Molded-Case Circuit Breakers and Circuit Breaker Enclosures
9. CSA Standard C22.2 No. 29-M1989 - Panelboards and Enclosed Panelboards
10. CSA Standard C22.2 No. 5-M91 - Molded Case Circuit Breakers
11. Federal Specification W-P-115C - Type I Class 1
12. Federal Specification W-C-375B/Gen - Circuit Breakers, Molded Case, Branch Circuit And Service.
13. NFPA 70 - National Electrical Code (NEC)
14. ASTM - American Society of Testing Materials

1.3 SUBMITTAL AND RECORD DOCUMENTATION

A. Approval documents shall include drawings. Drawings shall contain overall panelboard dimensions, interior mounting dimensions, and wiring gutter dimensions. The location of the main, branches, and solid neutral shall be clearly shown. In addition, the drawing shall illustrate one line diagrams with applicable voltage systems.

1.4 QUALIFICATIONS

A. Company specializing in manufacturing of panelboard products with a minimum of thirty (30) years documented experience.

B. Panelboards shall be manufactured in accordance with standards listed Article 1.2 - REFERENCES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inspect and report concealed damage to carrier within their required time period.

B. Handle carefully to avoid damage to panelboard internal components, enclosure, and finish.

C. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water, construction debris, and traffic.

1.6 OPERATIONS AND MAINTENANCE MATERIALS

A. Manufacturer shall provide installation instructions and NEMA Standards Publication PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

1.7 WARRANTY

A. Manufacturer shall warrant specified equipment free from defects in materials and workmanship for the lesser of one (1) year from the date of installation or eighteen (18) months from the date of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Shall be Square D, Eaton, Siemens or General Electric.

B. All panels shall have copper bus.

2.2 208/120 VOLT AND 240/120 VOLT PANELBOARD

A. NQOD

1. Interior
   a. Shall be type NQOD panelboard rated for 240 Vac/48 Vdc maximum. Continuous main current ratings, as indicated on associated drawings, not to exceed 600 amperes maximum.
   b. Minimum short circuit current rating: as shown on drawings but minimum 10,000 in rms symmetrical amperes at 240 Vac.
   c. Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be plated copper only. Bussing rated for 600 amperes shall be plated copper as standard construction. Bus bar plating shall run the entire length of the bus bar. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
   d. All current-carrying parts shall be insulated from ground and phase-to-phase by high dielectric strength thermoplastic.
   e. A solidly bonded copper equipment ground bar shall be provided. An additional copper isolated/insulated ground bar shall also be provided mounted on insulators.
   f. Split solid neutral shall be plated and located in the mains compartment up to 225 amperes so all incoming neutral cable may be of the same length. Where indicated UL Listed panelboards with 200% rated solid neutral shall be plated copper for non-linear load applications. Panelboards shall be marked for non-linear load applications.
   g. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.
   h. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label and short circuit current rating shall be displayed on the interior or in a booklet format.
   i. Interiors shall be field convertible for top or bottom incoming feed. Main circuit breakers in 100A interiors shall be vertically mounted. Main circuit breakers over 100A shall be vertically mounted. Sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.

2. Main Circuit Breaker where indicated.
   a. Shall be Square D type circuit breakers.
   b. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40° C ambient environment. Thermal elements shall be ambient compensating above 40° C.
   c. Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker that allows the user to

simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

d. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
e. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
f. Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable.
g. The circuit breakers shall be UL Listed for use with the following accessories: Shunt Trip, Under Voltage Trip, Ground Fault Shunt Trip, Auxiliary Switch, Alarm Switch, Mechanical Lug Kits, and Compression Lug Kits.

3. Branch Circuit Breakers
   a. Shall be Square D type circuit breakers. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated drawings.
   b. Molded case branch circuit breakers shall have bolt-on type bus connectors.
   c. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
   d. There shall be two forms of visible trip indication. The breaker handle shall reside in a position between ON and OFF. In addition, there shall be a red VISI-TRIP® indicator appearing in the clear window of the circuit breaker housing.
   e. The exposed faceplates of all branch circuit breakers shall be flush with one another.
   f. Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16.
   g. Breakers shall be UL Listed for use with the following factory installed accessories: Shunt Trip, Auxiliary Switch, and Alarm Switch.

4. Enclosures
   a. Type 1 Boxes
      1) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Galvannealed steel will not be acceptable.
      2) Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
      3) Box width shall be 20” wide maximum unless approved.
   b. Type 1 Fronts

1) Front shall meet strength and rigidity requirements per UL 50 standards. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
2) Fronts shall be hinged 1-piece with door (door in door). Mounting shall be as indicated on associated drawings.
3) Panelboards shall have MONO-FLAT fronts with concealed door hinges and mounted with trim screws. Front shall not be removable with the door locked. Doors on front shall have rounded corners and edges shall be free of burrs.
4) Front shall have cylindrical tumbler type lock with catch and spring-loaded stainless steel door pull. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.

c. Type 3R, 5, and 12 where indicated.
1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
2) All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional quarter turn fasteners on enclosures 59 inches or more in height. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.
3) Maximum enclosure dimensions shall not exceed 21” wide and 6.5” deep.

5. Provide Innovative Technology PTE-080 surge protector, 30/3 breaker with maximum 8” lead length at all 120/208V panels or TPS LP series. Provide flush kit at all panels that are flush in wall.

2.3 DISTRIBUTION PANELBOARDS

A. I-LINE Circuit Breaker Distribution Panelboard

1. Interior
a. Shall be Square D I-LINE type rated 600 Vac or 250 Vdc maximum. Continuous main current ratings as indicated on associated drawings not to exceed 1200 amperes maximum. Where distribution board noted above 1200 amperes provide switchboard. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.
b. Provide UL Listed short circuit current ratings (SCCR) as indicated on the associated drawings not to exceed the lowest interrupting capacity rating of any circuit breaker installed with a maximum of 200,000 RMS symmetrical amperes. Main lug and main breaker panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230.VI and VII.
c. The panelboard interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded

polyester insulators shall support and provide phase isolation to the entire length of bus.

d. The bussing shall be fully rated with sequentially phased branch distribution. Panelboard bussing rated 100 through 600 amperes shall be plated copper. Bussing rated 800 amperes and above shall be plated copper. Bus bar plating shall run the entire length of the bus bar. The entire interleaved assembly shall be contained between two (2) U-shaped steel channels, permanently secured to a galvanized steel-mounting pan by fasteners.

e. Interior trim shall be of dead-front construction to shield user from all energized parts. Main circuit breakers through 800 amperes shall be vertically mounted. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.

f. A solidly bonded copper equipment ground bar shall be provided. An additional copper isolated/insulated ground bar shall also be provided.

g. Solid neutral shall be equipped with a full capacity bonding strap for service entrance applications. Where indicated UL Listed panelboards with 200% rated solid neutrals shall have plated copper neutral bus for non-linear load applications. Gutter-mounted neutral will not be acceptable.

h. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label, and Short Circuit Current Rating shall be displayed on the interior or in a booklet format. Leveling provisions shall be provided for flush mounted applications.

2. Group mounted circuit breakers through 1200A
   a. Circuit breaker(s) shall be group mounted plug-on with mechanical restraint on a common pan or rail assembly.
   b. The interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.
   c. Circuit breakers equipped with line terminal jaws shall not require additional external mounting hardware. Circuit breakers shall be held in mounted position by a self-contained bracket secured to the mounting pan by fasteners. Circuit breakers of different frame sizes shall be capable of being mounted across from each other.
   d. Line-side circuit breaker connections are to be jaw type.
   e. All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.

3. Thermal magnetic molded case circuit breakers
   a. Molded case circuit breakers shall have integral thermal and instantaneous magnetic trip in each pole.
   b. Circuit protective devices shall be Square D molded case circuit breakers. Circuit breakers shall be rated as shown on schedules. Ampere ratings shall be as shown on the drawings.

4. Enclosures
   a. Type 1 Boxes

1) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Zinc-coated galvannealed steel will not be acceptable.
2) Boxes shall have removable blank end walls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.
3) Maximum enclosure dimensions shall be 44" wide and 9.5" deep.

b. Type 1 Trim Fronts
1) Trim front steel shall meet strength and rigidity requirements per UL 50 standards. Shall have an ANSI 49 medium gray enamel electrodeposited over cleaned phosphatized steel.
2) Trim front shall be hinged 1-piece with door available in flush or surface mount as indicated. Trim front door shall have rounded corners and edges free of burrs. A clear plastic directory cardholder shall be mounted on the inside of the door.
3) Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock.

c. Type 3R, 5, and 12 where indicated.
1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
2) All doors shall be gasketed and be equipped with a tumbler type vault lock and two (2) additional quarter turn fasteners. A clear plastic directory cardholder shall be mounted on the inside of door. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock.
3) Maximum enclosure dimensions shall not exceed 44" wide and 14.5" deep.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with manufacturer's written instructions, NEMA PB 1.1 and NEC standards.

3.2 FIELD QUALITY CONTROL

A. Inspect complete installation for physical damage, proper alignment, anchorage, and grounding.

B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

C. Check tightness of bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.

1.2 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.5 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

1.6 EXTRA MATERIALS

A. Furnish extra materials described in subparagraphs below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Provide ten (10) duplex receptacles, ten (10) switches, and six (6) GFCI receptacles each with fifty feet 3/4-inch EMT-5#12 and four (4) elbows each. All installed at location directed by owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

B. All wiring devices shall be white color.

C. Controlled receptacles shall receive a Leviton CRLAB label that indicates them as switched to comply with NEC 406.

2.2 STRAIGHT BLADE RECEPTACLES

A. All receptacles shall be tamperproof. Plugtail devices are acceptable.

1. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Cooper; TR5352 (duplex).
      2) Hubbell; TR5352 (duplex).
      3) Leviton; T5352 (duplex).
      4) Pass & Seymour; TR5352 (duplex).

2. Controlled Receptacles “C”: Green with controlled label and symbol.
   a. Leviton#TR5362-S1N

3. GFCI RECEPTACLES
   a. All exterior receptacles, receptacles within ten feet of sinks and mop sinks shall be GFCI type whether indicated on drawings or not.
   b. General Description: Straight blade. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
   c. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
      1) Products: Subject to compliance with requirements, provide one of the following:
         a) Pass & Seymour; TR2097 (No substitute).
   d. Controlled GFI receptacles shall be green color with controlled label

4. Range Receptacles: NEMA 14-50R
5. Dryer Receptacles: NEMA 14-30R

2.3 SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
   b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
   c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
   d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
10. Install double duplex, four-plex, and multiple switch locations under common plate.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Non-fusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Enclosures.

1.2 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified `and the unit will be fully operational after the seismic event."

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Qualification Data: For qualified testing agency.

D. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Field quality-control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Manufacturer's field service report.

G. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper conductors only.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors only.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper neutral conductors only.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open where required.
6. Hookstick Handle: Allows use of a hookstick to operate the handle.
7. Service-Rated Switches: Labeled for use as service equipment.

2.2 NONFUSIBLE SWITCHES

A. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Auxiliary Contact Kit: NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open where required.
5. Hookstick Handle: Allows use of a hookstick to operate the handle.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products to match panelboard breakers. Square D or GE (No Substitute).

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

I. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with 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. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NECA 1.

3.3 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION

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 ac, enclosed controllers rated 600 V and less, of the following types:

1. Across-the-line, manual and magnetic controllers.

1.3 MANUFACTURER

A. Square D, GE, Siemens or Cutler Hammer

1.4 SUBMITTALS

A. Product Data: For each type of enclosed controller. Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each enclosed controller.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
   a. Each installed unit's type and details.
   b. Nameplate legends.
   c. Short-circuit current rating of integrated unit.
   d. Listed and labeled for series rating of overcurrent protective devices in combination controllers by an NRTL acceptable to authorities having jurisdiction.
   e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices in combination controllers.

2. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that enclosed controllers, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems" Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For enclosed controllers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Routine maintenance requirements for enclosed controllers and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance and repairs.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Source Limitations: Obtain enclosed controllers of a single type through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with NFPA 70.

F. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed controllers, minimum clearances between enclosed controllers, and for adjacent surfaces and other items. Comply with indicated maximum dimensions and clearances.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store enclosed controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.

B. If stored in areas subject to weather, cover enclosed controllers to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install electric heating of sufficient wattage to prevent condensation.

1.7 COORDINATION

A. Coordinate layout and installation of enclosed controllers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

C. Coordinate features of enclosed controllers and accessory devices with pilot devices and control circuits to which they connect.

D. Coordinate features, accessories, and functions of each enclosed controller with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Square D
2. Eaton Corporation; Cutler-Hammer Products.
3. General Electrical Company; GE Industrial Systems.
4. Siemens/Furnas Controls.

2.2 ACROSS-THE-LINE ENCLOSED CONTROLLERS

A. Manual Controller (Starter): NEMA ICS 2, general purpose, Class A, with "quick-make, quick-break" toggle or pushbutton action, and marked to show whether unit is "OFF," "ON," or "TRIPPED."

1. Overload Relay: Ambient-compensated type with inverse-time-current characteristics and NEMA ICS 2, Class 10 tripping characteristics. Relays shall have heaters and sensors in each phase, matched to nameplate, full-load current of specific motor to which they connect and shall have appropriate adjustment for duty cycle.
2. Square D Class 2510

B. Magnetic Controller (Starter): NEMA ICS 2, Class A, full voltage, non-reversing, across the line, unless otherwise indicated.

1. Control Circuit: 120 V; obtained from integral control power transformer with a control power transformer of sufficient capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity.
2. Overload Relay: Ambient-compensated type with inverse-time-current characteristic and NEMA ICS 2, Class 10 tripping characteristic. Provide with heaters or sensors in each phase matched to nameplate full-load current of specific motor to which they connect and with appropriate adjustment for duty cycle.
3. Hand off auto switch.
4. Red running and green stop pilot lights.
5. Control transformer.
6. Provide power factor correction capacitors for all motors over 15 HP to 95%.

C. Combination Magnetic Controller (Starter): Factory-assembled combination controller and disconnect switch.

1. Fusible Disconnecting Means: NEMA KS 1, heavy-duty, fusible switch with rejection-type fuse clips rated for fuses. Select and size fuses to provide Type 2 protection according to IEC 947-4-1, as certified by an NRTL. Provide type RK1 time delay fuses
2. Magnetic controller per above.
3. Square D 8538, or equal.

2.3 ENCLOSURES

A. Description: Flush- or surface-mounting cabinets as indicated. NEMA 250, Type 1, unless otherwise indicated to comply with environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 3R.
2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
4. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

2.4 ACCESSORIES – FOR UNITS OVER 15 HP

A. Devices shall be factory installed in controller enclosure, unless otherwise indicated.

B. Elapsed Time Meters: Heavy duty with digital readout in hours.

C. Phase-Failure and Undervoltage Relays: Solid-state sensing circuit with isolated output contacts for hard-wired connection. Provide adjustable undervoltage setting.

D. Current-Sensing, Phase-Failure Relays for Bypass Controllers: Solid-state sensing circuit with isolated output contacts for hard-wired connection; arranged to operate on phase failure, phase reversal, current unbalance of from 30 to 40 percent, or loss of supply voltage; with adjustable response delay.

2.5 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested enclosed controllers before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces to receive enclosed controllers for compliance with requirements, installation tolerances, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Select features of each enclosed controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, controller, and load; and configuration of pilot device and control circuit affecting controller functions.

B. Select horsepower rating of controllers to suit motor controlled.

3.3 INSTALLATION

A. For control equipment at walls, bolt units to wall or mount on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Division 26 Section "Hangers, Supports and Fasteners."

B. Enclosed Controller Fuses: Install fuses in each fusible switch. Comply with requirements in Division 26 Section "Fuses."

3.4 IDENTIFICATION

A. Identify enclosed controller, components, and control wiring according to Division 26 Section "Identification for Electrical Systems."

3.5 CONTROL WIRING INSTALLATION

A. Install wiring between enclosed controllers where shown on drawings. Control wiring is assumed in mechanical unless shown.

B. Bundle, train, and support wiring in enclosures.

C. Connect hand-off-automatic switch and other automatic-control devices where applicable.

1. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.

2. Connect selector switches with enclosed controller circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.6 CONNECTIONS

A. Conduit installation requirements are specified in other Division 26 Sections. Drawings indicate general arrangement of conduit, fittings, and specialties.

B. Ground equipment according to Division 26 Section "Grounding."

3.7 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each enclosed controller element, bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Perform the following field tests and inspections and prepare test reports:

1. Perform each electrical test and visual and mechanical inspection, except optional tests, stated in NETA ATS, "Motor Control - Motor Starters." Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.8 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain enclosed controllers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-state luminaires that use LED technology.
2. Lighting fixture supports.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project, IES LM-79 and IES LM-80.
    a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
    b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps. See Drawings for schedule

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Lighting luminaires.
2. Suspended ceiling components.
3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches (300 mm) of the plane of the luminaires.
4. Structural members to which luminaires will be attached.
5. Initial access modules for acoustical tile, including size and locations.
6. Items penetrating finished ceiling, including the following:
    a. Other luminaires.
    b. Air outlets and inlets.
    c. Speakers.
    d. Sprinklers.
    e. Access panels.
    f. Ceiling-mounted projectors.
7. Moldings.

B. Qualification Data: For testing laboratory providing photometric data for luminaires.

C. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

D. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Product Certificates: For each type of luminaire.

F. Product Test Reports: For each luminaire, for tests performed by a qualified testing agency.

G. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

C. Provide luminaires from a single manufacturer for each luminaire type.

D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

E. Mockups: For interior lighting luminaires in room or module mockups, complete with power and control connections.

1. Obtain Architect's approval of luminaires in mockups before starting installations.
2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 TEST REPORTS

A. LED Luminaire IES LM-79: Test Report Submit test report on manufacturer's standard production model luminaire. Include all applicable and required data as outlined under "14.0 Test Report"

B. LED Light Source IES LM-80 Test Report: Submit report on manufacturer's standard production LED light source (package, array, or module). Include all applicable and required data as outlined under

C. LED Light Source IES TM21 Test Report: Submit test report on manufacturer's standard production LED light source (package, array or module). Include all applicable and required data, as well as required interpolation information as outlined in IES TM-21.

1.9 LUMINAIRE USEFUL LIFE CERTIFICATE

A. Submit certification from the manufacturer indicating the expected useful life of the luminaires provided. The useful life must be directly correlated from the IES LM-80 test data using procedures outlined in IES TM-21. Thermal properties of the specific luminaire and local ambient operating temperature and conditions must be taken into consideration

1.10 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Verify available warranties and warranty periods.

C. Warranty Period: Minimum Five year(s) from date of Substantial Completion unless manufacturers standard warranty is longer

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. Recessed Fixtures: Comply with NEMA LE 4.

D. Bulb shape complying with ANSI C79.1.

E. Lamp base complying with ANSI C81.61

F. CRI of minimum 80 unless noted. CCT of 4000 K unless noted

G. Minimum Rated lamp life of 50,000 hours.

H. Lamps dimmable from 100 percent to 0 percent of maximum light output.

I. Internal driver.

J. Nominal Operating Voltage: Per Drawings

1. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

K. Housings:

1. Extruded-aluminum housing and heat sink.
2. Custom color per architect from provided paint chip

2.3 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers and Globes: Per drawings

1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

D. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
   a. "USE ONLY" and include specific lamp type.
   b. Lamp diameter, shape, size, wattage, and coating.
   c. CCT and CRI for all luminaires.

2.4 LED POWER SUPPLIES/DRIVERS

A. UL 8750 LED power supplies (drivers) must be electronic, UL Class 1 , constant-current type and comply with the following requirements:

1. Output power (watts) and output current (mA) as shown in luminaire schedule for each luminaire type to meet minimum luminaire efficacy (LE) value provided.
2. Power Factor (PF) greater than or equal to .90.
3. Total Harmonic Distortion (THD) of less than 20%.
4. Class A sound rating.
5. Operable at input voltage of 120-277 volts at 60 hertz.
6. Minimum 5 year manufacturer's warranty.
7. RoHS compliant.
8. Integral thermal protection that reduces output power if case temperature exceeds 185 degrees F 85 degrees C

2.5 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.6 LUMINAIRE FIXTURE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)

D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

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 luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaire Support:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls or Attached to a minimum 20 gauge backing plate attached to wall structural members
2. Do not attach luminaires directly to gypsum board.

G. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with two 5/32-inch- (4-mm-) diameter aircraft cable supports connected to structure above ceiling
2. Ceiling mount with pendant mount with minimum 5/32-inch- (4-mm-)] diameter aircraft cable supports.
3. Ceiling mount with hook mount.

H. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.

2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod wire support for suspension for each unit length of luminaire chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

I. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Retain first subparagraph below to require ceiling grid to be connected to building structure at four corners of luminaire opening.
3. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
4. Retain subparagraph below if ceiling grid is not connected to building structure at four corners of the luminaire opening.
5. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.6 STARTUP SERVICE

A. Comply with requirements for startup specified in Section 260943.16 "Addressable-Fixture Lighting Controls."

B. Comply with requirements for startup specified in Section 260943.23 "Relay-Based Lighting Controls."

3.7 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

DIVISION 28
ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Owner-Contractor Agreement, the General and Supplementary Conditions and Modifications to General Conditions apply to the work specified in this section.

1.2 DESCRIPTION

A. Provide a new fully addressable fire alarm system serving the building.

B. System shall be a complete and fully functional fire alarm system in compliance with applicable codes and requirements of authority having jurisdiction.

C. System shall include fire alarm control panel, LCD annunciator, smoke detectors, horns, strobes, raceways, wiring, and all other devices and accessories required for a complete and fully functional fire alarm system.

D. Silent Knight products are listed herein to establish a basis of design and performance. Similar and equal systems by other manufacturers are acceptable.

E. Fire alarm supplier for City of Mercer Island:

Fire Protection, Inc.
17410 Ash Way
Lynnwood, WA 98037
425-290-9600
Attn: Trevor Kracht
trevor@fpiseattle.com

1.3 CODES

A. System shall comply with International Fire Code (with City of Mercer Island amendments) and City of Mercer Island Fire Marshal requirements.

B. Submit shop drawings to the City of Mercer Island Fire Marshal and obtain approval. Comply with all City of Mercer Island Fire Marshal shop drawing comments.

C. Obtain and pay for permit as required for work.

PART 2 - PRODUCTS

2.1 SYSTEM COMPONENTS

A. System components shall be equal to the following Silent Knight catalog numbers. Installer shall be a factory authorized installer.

Control Panel	Silent Knight 6700, fully addressable. Provide all power supplies, addressable modules, zone modules, batteries, and so forth as required to provide a complete system.
Manual Stations	SK-PULL-SA, single action
Smoke Detectors	SD505 series, addressable
Duct Smoke Detectors	SD505-DUCT series, addressable Provide remote indicator light.
Horns	SpectrAlert series. Combined horn/strobe units. Low frequency where required by code.
Strobes	SpectrAlert series. Synchronized per ADA requirements. Candela rating as required by code for area coverage.
Heat Detectors	SD505-HEAT series, addressable. Fixed temperature or rate of rise as required.
LCD Annunciator	Provide with all Fire Alarm controls. Silent Knight 5860

Wire shall be rated 105 degree C, fire alarm type per NEC ratings.

Gel Cell Batteries.

Provide wireless monitoring of fire alarm system. AES Intellinet wireless communicator. Owner will contract with monitoring service.

PART 3 - EXECUTION

3.1 GENERAL

A. Training: Include 4 hours of training on system functions for Owner’s personnel.

3.2 TESTING

A. Install system complete for operation and test in presence of Fire Marshal.

B. Obtain Fire Marshal approval via testing process.

3.3 MANUFACTURER'S ACCEPTANCE

A. Manufacturer's representative to submit letter stating that he has tested the system and found it acceptable in all respects.

3.4 FIRE ALARM REVIEW

A. Submit complete fire alarm system shop drawings to Fire Marshal for review before proceeding with installation. Obtain Fire Marshal's approval after installation.

3.5 BATTERY BACK-UPS

A. System shall be sized at 200% required to power all devices connected to the fire alarm system.

B. Time period for back-up will be as required by the Fire Marshal. Minimum time 24 hours.

C. Submit battery calculations to Fire Marshal.

3.6 LCD ANNUNCIATOR

A. Located at main entry to building.

B. Confirm location with Architect and Fire Marshal.

END OF SECTION

APPENDIX A

Geotechnical Report

Geotechnical Engineering Services

Luther Burbank Park Upland Improvements Mercer Island, Washington

for

City of Mercer Island

August 5, 2022

GeoEngineers

Earth Science + Technology

Geotechnical Engineering Services

Luther Burbank Park Upland Improvements
Mercer Island, Washington

for
City of Mercer Island

August 5, 2022

GeoEngineers

1101 Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Geotechnical Engineering Services

Luther Burbank Park Upland Improvements
Mercer Island, Washington

File No. 0817-024-01

August 5, 2022

Prepared for:

City of Mercer Island Public Works
9601 SE 36th Street
Mercer Island, Washington 98040

Attention: Paul West, CIP Project Manager

Prepared by:

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1.0 INTRODUCTION AND PROJECT UNDERSTANDING

This report presents the results of our geotechnical engineering services for the Luther Burbank Park Upland Improvements project. The project site is located at 2040 84th Avenue SE in Mercer Island, Washington. A vicinity map is provided as Figure 1. Our understanding of the project is based on our communications with you and project partners, KPFF and Swenson Say Faget, review of the 30 percent upland improvement plans (dated September 8, 2022), review of construction plans for the existing dock and portions of the shoreline bulkhead dated April 1973 (1973 Dock Plans), and our prior experience at the site. We are currently providing geotechnical engineering services to support improvements to the existing docks at the park. This work is ongoing, and our services related to the dock will be provided in a separate geotechnical report.

Proposed upland improvements are expected to consist of four main components:

- A seismic retrofit of the existing boiler plant building, and installation of a perimeter drain around the structure boiler plant and concessions/restroom building.
- Construction of a new Americans with Disability Act (ADA) accessible pedestrian ramp leading from existing trails to a second-story rooftop classroom area on top of the restroom building.
- Replacement of existing pavement with low impact surfacing such as permeable pavers, Silva Cells or other similar products intended to limit stormwater runoff and construction.
- Decommissioning of underground storage tanks (USTs) in accordance with applicable regulations.

We understand that seismic design for the restroom building retrofit will be competed in accordance with ASCE 41-17. Seismic design for the pedestrian ramp will be completed in accordance with the 2018 International Building Code (IBC). We expect that stormwater management facilities at the site will be designed in accordance with 2014 Washington State Department of Ecology Stormwater Management Manual for Western Washington (SWMMWW) which has been adopted by the City of Mercer Island.

Based on the available information, we understand that there are two abandoned USTs in the project vicinity that were associated with previous boiler plant operations and that petroleum hydrocarbons associated with the tanks have been detected in site soil. We understand that the City of Mercer Island (City) is assessing the status of the tanks and current plans include leaving the tank in place, however removal of the tank is also being evaluated. GeoEngineers is providing environmental service to support decommissioning of the USTs. Our environmental services are being provided in separate deliverables.

2.0 SCOPE OF SERVICES

The purpose of our services was to explore subsurface conditions at the site as a basis for providing geotechnical recommendations for design and construction. Our services were completed in accordance with our signed agreement dated January 4, 2022. Our specific scope of services is summarized in our proposal dated January 4, 2022.

3.0 SITE CONDITIONS

3.1. Surface Conditions

The project site is located on the shoreline of Lake Washington approximately in the geographical center of the parks' shoreline frontage. Development at the site includes the historic brick boiler plant building, a brick restroom building that connects to the southwest corner of the boiler plant, a concrete shoreline bulkhead, concrete and brick paved sidewalks and landscaped areas.

The boiler plant and restroom buildings are constructed into the toe of an upland slope that grades downward from the higher elevation portions of the park to the west to shoreline of Lake Washington. The slope behind the buildings is on the order of 50 to 60 feet tall and is inclined between 2 Horizontal to 1 Vertical (2H:1V) and 1.25H:1V. There is about a 1-foot gap between the back (western) sides of the buildings and the slope except for the lower 4 to 5 feet of the slope toe where the western walls of the buildings retain the lower portion of the slope. The upland slope behind the buildings is vegetated with trees and developed with foot-trails that provide access to the shoreline. Access to the shoreline area is also provided by two more primary routes: (1) a gravel surfaced maintenance road to the south of the buildings that is inclined around 4H:1V and (2) an asphalt paved walkway to the north of the building that is inclined on the order of 2H:1V. An apparent stormwater conveyance swale (ditch) is located along the western edge of the gravel maintenance road.

The existing shoreline bulkhead is approximately 200 feet long. The southern terminus of the bulkhead is just south of the access point to docks and the northern terminus of the bulkhead is about 15 feet north of the boiler plant building. The bulkhead has two circular "push-outs" that provide viewing areas. The southern push-out is planted with three trees. Based on our review of historic areal imagery, we understand the straight section of bulkhead in front of the boiler plant building was construed at the same time as the boiler plant (approximately 1928). The push-outs appear to have been constructed at the same time as the restroom building (1970's). According to the 1973 Dock Plans, the push out sections of the bulkhead are supported on shallow foundations. We expect that the original section of bulkhead and the existing boiler plant and restroom buildings are also supported on shallow foundations.

3.2. Subsurface Conditions

3.2.1. Literature Review

We reviewed the Geologic Map of King County (2007). According to the map the project site is underlain by glacial till (Qvt). Glacial till is typically comprised of a mixture of sand, gravel and cobbles in a silt matrix. Glacial till soils were consolidated by the weight of the overriding glacier and are typically dense to very dense.

We reviewed geologic and geotechnical information provided to us for other projects completed within Luther Burbank Park. This included photos from installation of a stormwater utility on the north side of the boiler plant building in 2018. The soils exposed in the reviewed photos are consistent with glacial till or other glacially consolidated soils.

We also searched for readily available geotechnical information in the project vicinity using the Washington State Department of Natural Resources Geologic Information Portal. We reviewed summary exploration logs associated with design of the Mercer Island Community and Event Center which is located to the west

and upland of Luther Burbank Park. Reviewed exploration logs indicated that dense glacially consolidated soils were present near existing ground surface at that site.

3.2.2. Subsurface Explorations and Laboratory Testing

As part of our study, we advanced three hollow stem auger borings in the vicinity of the proposed improvements. The locations of our explorations are shown on the Site Plan, Figure 2. The borings were drilled on April 1, 2020 to depths between 11 and 13.5 feet below ground surface (bgs). A description of the field exploration program and the boring logs are presented in Appendix A.

Soil samples obtained from the borings were taken to our Redmond geotechnical laboratory for further evaluation. Testing included moisture content determinations, percent fines determinations and gradation analyses. A description of the laboratory test procedures and test results are presented in Appendix A.

3.2.3. Soil Conditions

Borings B-1 and B-2 were advanced in areas currently surfaced with sod. Sod thicknesses were typically on the order of 6 inches or less. Below the sod in B-1 and B-2 we observed what we interpret to be glacial till. Glacial till soils typically consisted of hard silt with sand and sandy silt with. We observed occasional gravel within the till and while not directly observed, we expect that cobbles and boulders could also be present within the glacial till. Practical drilling refusal was encountered in B-1 around 13.5 feet bgs and around 11 feet bgs in B-2.

B-3 was advanced within a concrete paved sidewalk area near the location of the relic USTs. Concrete thickness was on the order of 6 inches at the boring location and the concrete was underlain by about 4 inches of base course material. Below the base course in B-3 we observed what we interpret to be fill extending to around 7 feet bgs. Underlaying the fill was glacial till. Observed fill generally consisted of stiff sandy silt which we expect is reworked native soil. Underlying glacial till was hard and consisted of material similar to the glacial till observed in B-1 and B-2.

3.2.4. Groundwater Conditions

Our understanding of groundwater conditions is based on conditions observed during drilling of our borings and groundwater measurements taken in two previously installed monitoring wells at the site. The monitoring wells are located about 5 feet from the eastern edge of the shoreline bulkhead within the brick paved sidewalk area in front of the restroom building. Groundwater was measured in these wells around 2 feet below ground surface which was consistent with the distance to the water level in Lake Washington as measured from the ground surface elevation of the bulkhead. We expect that the groundwater observed in the wells is hydraulically connected with the water levels in Lake Washington and will fluctuate seasonally with lake levels.

Groundwater was observed in B-3 around 3 feet bgs during drilling. B-3 was located about 5 feet west of the previously mentioned monitoring wells. The groundwater observed in B-3 was located within the fill and was perched on top of the underlying glacial till soils which were observed to be moist.

We did not observe groundwater during drilling of B-1 and B-2. Soil samples collected in B-1 and B-2 appeared moist and we did not observe indications of soil oxidation or staining that would suggest that groundwater periodically flows through the glacial till. Based on these observations it does not appear that the water in Lake Washington penetrates into or flows through the intact glacial till at the site.

During our surface reconnaissance we did not observe active groundwater seepage on the face of the hillside behind the boiler plant and restroom building. However, based on our conversations with the project team we understand that groundwater seepage is routinely observed on the face of the hillside in some areas. This is not unusual on slopes comprised of glacially consolidated soils and perched groundwater tends to accumulate within portions of the deposits that contain higher percentages of sand and gravel and lower percentages of silt and clay or within areas that have higher degree of weathering. Perched groundwater volumes tend to fluctuate throughout the year typically being highest during winter and spring months and during periods of prolonged precipitation.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1. Geologic Hazards

We evaluated the site for geologic hazards as described in Mercer Island City Code 19.07.160 – Geologically Hazardous Areas. This includes landslide hazard areas, seismic hazard areas, and erosion hazard areas. We did not observe indicators of a landslide hazard area during our study. Potential seismic hazards are addressed in the Seismic Design section. In our opinion, the site does not pose an erosion hazard provided best management practices are implemented and our erosion and sedimentation control recommendations are followed as outlined in the Site Development and Earthwork section. Based on our review of available information, to our knowledge, no other geologic hazards are mapped in the project area.

4.2. Seismic Design

4.2.1. Seismic Design Parameters

The tables below provide seismic design parameters developed in accordance with ASCE 41-17 for the BSE-1 (5 percent chance of exceedance in 50 years) and BSE-2 (20 percent chance of exceedance in 50 years) seismic events and in accordance with the 2018 IBC which references ASCE 7-16. The project site is underlain by dense to very dense glacially consolidated soils and we recommend using a response spectrum for Site Class C for this site.

TABLE 1. SEISMIC DESIGN PARAMETERS ASCE 41-17

Seismic Design Parameter	BSE-1 (5% exceedance in 50 years)	BSE-2 (20% exceedance in 50 years)
Spectral Response Acceleration at Short Periods (S_S)	1.034g	0.489
Spectral Response Acceleration at 1-Second Periods (S_1)	0.351g	0.152
Site Class	C	C
Site Modified Spectral Response Acceleration at Short Periods (S_{XS})	1.241g	0.635
Site Modified Spectral Response Acceleration at 1-Second Periods (S_{X1})	0.527g	0.228

TABLE 2. SEISMIC DESIGN PARAMETERS 2018 IBC

2018 IBC Seismic Design Parameters	
Spectral Response Acceleration at Short Periods (S_S)	1.388g
Spectral Response Acceleration at 1-Second Periods (S_1)	0.482g
Site Class	C
Site Modified Peak Ground Acceleration (PGA_M)	0.712g
Design Spectral Response Acceleration at Short Periods (SD_S)	1.11g
Design Spectral Response Acceleration at 1-Second Periods (SD_1)	0.483g

4.2.2. Liquefaction, Lateral Spreading and Surface Rupture

Liquefaction refers to a condition where vibration or shaking of the ground, usually from earthquake forces, results in development of excess pore pressures and subsequent loss of strength in the affected soil deposit. In general, soils that are susceptible to liquefaction include loose to medium dense "clean" to silty sands that are below the water table.

Based on the soil conditions observed in our explorations and our understanding of the site geology, in our opinion it is unlikely that there are potentially liquefiable soils present at the project site and there is a low risk of liquefaction occurring during the seismic design events.

Lateral spreading related to seismic activity typically involves lateral displacement of large, surficial blocks of non-liquefied soil when an underlying soil layer loses strength during seismic shaking. Lateral spreading usually develops in areas where sloping ground or large grade changes (including retaining walls) are present. Due to the low liquefaction risk at the site, in our opinion there is also a low risk of lateral spreading occurring at this site.

According to the Department of Natural Resources Seismic Hazards Map, the project site is in the vicinity of the Seattle Fault zone. However, because bedrock in this area is covered by hundreds of feet of glacial soils, it is unlikely that movement of the fault would result in significant surface rupture at the ground surface.

4.3. Foundation Support

4.3.1. General

The sections below provide design and construction recommendations for conventional shallow foundations (spread footings), drilled pier type foundations (pier foundations) and micropiles. We have also included recommendations for evaluating the foundations of existing structures at the site.

We understand that a perimeter footing drain will be installed on the west side of the existing restroom and boiler plant buildings. Recommendations for design of footing drains are included in Section 4.3.2.6.

4.3.2. Spread Footings

4.3.2.1. General

In our opinion, the proposed structures can be adequately supported on shallow foundations bearing on glacial till soils. Glacial till soils are expected to be present within about a foot of the ground surface across the site. The depth to glacial till could vary in areas where grading or fill activities have occurred. Because glacial till soils are expected to be present at shallow depths, we recommend that existing fill, if present, be removed from below footings.

For spread foundation design, we recommend that footings be established at least 18 inches below the lowest adjacent grade and have minimum widths of 24 inches.

4.3.2.2. Foundation Bearing Surface Preparation and Protection

Shallow footing excavations should be performed using a smooth-edged bucket to limit bearing disturbance. We recommend that the base of all footing excavations be proof compacted to a uniformly firm and unyielding condition prior to placement of structural fill, formwork or rebar. Loose or disturbed materials present at the base of footing excavations should be removed or compacted. Fill, if present, should be removed from below spread footings. If soft or otherwise unsuitable areas are observed at the foundation bearing surface that cannot be compacted to a stable and uniformly firm condition the following options may be considered: (1) the exposed soils may be moisture conditioned and recompacted; or (2) the unsuitable soils may be overexcavated and replaced with compacted structural fill, as needed.

Foundation bearing surfaces should not be exposed to standing water. If water is present in the excavation, it must be removed before placing structural fill, formwork and reinforcing steel. Protection of exposed soil should be considered during the wetter times of the year. Typically, a 3- to 4-inch lean concrete mat or a 6- to 8-inch crushed rock section is suitable for foundation bearing surface protection.

Prepared foundation bearing surfaces should be observed and evaluated by a member of our firm prior to placement of structural fill, formwork or steel reinforcement. Our representative will confirm that the bearing surfaces have been prepared in accordance with our recommendations and is suitable for supporting the design footing load and provide recommendations for remediation, if necessary.

4.3.2.3. Allowable Soil Bearing Resistance

Spread footings bearing on subgrades prepared as recommended may be designed using an allowable soil bearing pressure of 4,000 pounds per square foot (psf). This bearing pressure applies to the total of dead and long-term live loads and may be increased by one-third when considering total loads, including earthquake or wind loads. This bearing pressure assumes that footings are located on level ground. If footings are located in areas of sloping ground, the allowable bearing pressure should be decreased by a factor of 0.5 for slope inclinations up to 2H:1V. We do not recommend that spread footings be located on slopes that are steeper than 2H:1V.

These are net bearing pressures. The weight of the footing and overlying backfill can be ignored in calculating footing sizes. Higher bearing pressures may be applicable on a case-by-case basis provided footing elevations, loading conditions are known, and subgrades are protected during construction. We can work with the design team to evaluate increased bearing pressures, if this would provide value to the project.

4.3.2.4. Foundation Settlement

Disturbed soil must be removed from the base of footing excavations and the bearing surface should be prepared as recommended. Provided these measures are taken, we estimate the total static settlement of shallow foundations will be on the order of 1 inch or less for the bearing pressures presented above. Differential settlements could be on the order of ¼ to ½ inch between comparably loaded isolated column footings or along 50 feet of continuous footing. Settlement is expected to occur rapidly as loads are applied. Settlements could be greater than estimated if loose or disturbed soil is present beneath footings.

4.3.2.5. Lateral Resistance

The ability of the soil to resist lateral loads is a function of frictional resistance, which can develop on the base of footings and slabs and the passive resistance, which can develop on the face of below-grade elements of the structure as these elements tend to move into the soil. The allowable frictional resistance on the base of the footing may be computed using a coefficient of friction of 0.4 applied to the vertical dead-load forces. The allowable passive resistance on the face of the footing or other embedded foundation elements may be computed using an equivalent fluid density of 350 pounds per cubic foot (pcf) for undisturbed site soils or structural fill extending out from the face of the foundation element a distance at least equal to two and one-half times the depth of the element. These values include a factor of safety of about 1.5.

The passive earth pressure and friction components may be combined provided that the passive component does not exceed two-thirds of the total. For level ground conditions, the top foot of soil should be neglected when calculating passive lateral earth pressure unless the area adjacent to the foundation is covered with pavement or a slab-on-grade. If footings are located on sloping ground, the top 2 feet of soil should be neglected when calculating passive lateral earth pressures.

4.3.2.6. Perimeter Footing Drains

We understand that a perimeter drain will be installed on the west side of the existing building. Perimeter footing drains should be provided with cleanouts and should consist of at least 4-inch-diameter perforated pipe surrounded on all sides by 6 inches of drain material enclosed in a non-woven geotextile fabric for underground drainage to prevent fine soil from migrating into the drain material. We recommend that the drainpipe consist of either heavy-wall solid pipe or rigid corrugated smooth interior polyethylene pipe. We do not recommend using flexible tubing for footing drainpipes. The drain material should consist of pea gravel or material similar to “Gravel Backfill for Drains” per Washington State Department of Transportation (WSDOT) Standard Specifications Section 9-03.12(4). The perimeter drains should be sloped to drain by gravity, if practical, to a suitable discharge point. Water collected in roof downspout lines must not be routed to the perimeter footing drains. Provided the envisioned perimeter footing drain is installed as recommended, in our opinion individual footing drains or below slab drains are not necessary.

4.3.3. Bearing Resistance of Existing Footings

We understand that the existing footings for the boiler plant, restroom building, and bulkhead walls will be evaluated considering current building codes and may be relied upon to resist loads from new improvements. Based on review of provided as-built drawings the existing structures are supported on shallow spread footings. It is unclear what bearing pressures were assumed for design of the footings and what methods were used for preparing foundation bearing surfaces. At this time, we recommend that the existing footings be evaluated using an allowable bearing resistance of 3,500 psf. Existing footings can be evaluated using the lateral resistance values provided above.

If more information on design and construction of the existing footings is obtained, or if can be confirmed that the existing foundations are bearing directly on intact glacial till, we expect that a higher bearing resistance bearing could be considered. Depending on structural demands it could be necessary to retrofit existing footings using deep foundations. For this site we expect that drilled micropiles are the most feasible solution for reinforcing existing footings. Recommendations for design and construction of micropiles are included in Section 4.2.5 of this report.

4.3.4. Pier Foundations

4.3.4.1. General

We expect that pier foundations will consist of a precast or cast in place concrete foundation installed into a predrilled/or excavated hole. The sections below provide recommendations for design and construction of pier foundations.

4.3.4.2. Axial Resistance

Pier foundations will achieve axial downward resistance through end bearing resistance at the toe of the pier and through skin friction along the length of the foundation. Uplift resistance will be achieved through skin friction only.

We recommend that end bearing resistance of pier foundations be estimated assuming an allowable soil bearing pressure of 5,000 psf. Downward skin friction resistance can be estimated using an allowable unit skin resistance of 350 psf per linear foot of embedded foundation. Uplift skin friction resistance can be estimated using an allowable unit skin resistance of 300 psf per linear foot of embedded foundation. These values are appropriate for foundation embedment depths up to about 15 feet. If foundation embedment depths are expected to exceed, we should be contacted to consider a revised estimate of pier axial resistance based on the proposed structure.

For example, a 2 foot diameter pier footing embedded 10 feet below grade would achieve the following **allowable** resistances:

$$End\ Bearing\ Resistance = \text{Bearing pressure } (psf) \times Toe\ Area\ (sf)$$

$$= 5{,}000 psf\ \times\ \pi(\frac{2\ ft.}{2})^2 \cong 15{,}700\ lbs.$$

$$Downward\ Skin\ Resistance = Unit\ Skin\ Resistance \times Pier\ Perimeter\ (ft) \times Pier\ Embedment(ft)$$

$$= 350\ psf\ \times \pi\ (2\ ft) \times 10\ ft. \cong 22{,}000\ lbs.$$

$$Upward\ Skin\ Resistance = Unit\ Uplift\ Resistance \times Pier\ Perimeter\ (ft) \times Pier\ Embedment(ft)$$

$$= 300\ psf\ \times \pi(2\ ft) \times 10\ ft. \cong 18{,}850\ lbs.$$

4.3.4.3. Lateral Resistance

The tables below provide recommendations for evaluating lateral resistance of pier foundations. Table 3 provides allowable lateral bearing resistance values for the soils encountered in our borings. Lateral bearing resistances are based on correlations presented in Table 17-2 of the WSDOT *Geotechnical Design Manual*.

TABLE 3. LATERAL SOIL BEARING RESISTANCE

Depth Range (feet)	Allowable Lateral Bearing Resistance (psf)
0 to 5	2,000
5 and below	4,500

Table 4 provides recommended soil parameters for lateral pier foundation analyses using the software program LPILE (Ensoft Inc. 2016).

TABLE 4. RECOMMENDED LPILE PARAMETERS

Depth Range (feet)	p-y Curve Type	Eff. Unit Wt. (pcf)	Friction Angle (deg)	K (pci)
0 to 5	Sand (Reese)	125	34	200
5 and below	Sand (Reese)	125	38	225

If lateral pier foundation analyses are completed using LPILE, we recommend that we be allowed to review the results of the analyses to confirm that the results are consistent with our experience designing foundations and our understanding of soil conditions at the site.

4.3.4.4. Construction Considerations

We present two conditions to consider when constructing pier foundations.

- Condition 1, an excavation the same dimension of the designed foundation is created, and the precast foundation is placed in the excavation or the foundation is cast directly against undisturbed earth; or
- Condition 2, an excavation larger than the designed dimension of the foundation is created, a casing is placed into the excavation and the foundation concrete is cast inside the casing. The casing could be left in place permanently or removed from the excavation as the foundation is constructed. If the casing is left in place any overexcavated area outside of the casing would need to be backfilled with controlled density fill (CDF).

Construction of Condition 1 requires the sidewalls of the excavation to stay stable during construction of the foundation. Construction of Condition 2 does not require the sidewalls of the excavation to remain stable. Based on the soil and groundwater conditions at the site, in our opinion it is feasible to complete excavations for drilled pier foundations without the use of temporary casing (Condition 1). The use of temporary casing could still be desirable in areas of sloping ground, if groundwater seepage is encountered in excavations, or if the excavations will be left open for an extended period of time. If a sacrificial or permanent casing is used, this practice should be coordinated with the structural engineer.

Excavations for drilled pier foundations discussed above are typically completed with augers attached to tracked excavator type equipment. The size of excavator needed to complete the excavation will depend on the foundation diameter and depth. Selection of this foundation alternative should consider equipment access restrictions to the foundation locations.

We recommend that the base of the pier footing excavations be free of loose or disturbed soils prior to construction of the foundation. If loose or disturbed soils are present at the base of the excavation and cannot be adequately compacted or removed, we recommend that quarry spalls be pushed into the excavation subgrade until a stable base is established. If water accumulates in the excavation, the water should be removed from the excavation prior to pouring concrete.

4.3.5. Micropiles

4.3.5.1. General

Micropiles are small-diameter drilled piles (typically less than 12 inches in diameter) that are constructed by drilling a hole, placing reinforcement and then grouting the hole. Various methods can be used to drill the holes for micropiles. In our opinion, any drilling method can be considered provided it can form a stable hole at the required dimensions and within specified tolerances. Temporary casings are often used to help maintain stability of the excavation sidewalls during micropile drilling. In some cases, the steel casing is left in place, especially within the upper portions of the pile to increase the structural capacity of the micropiles.

Reinforcement generally consists of a large steel reinforcing bar installed down the center of the hole. The grouting method used to construct the micropiles has a significant impact on capacity. Micropiles installed by gravity grouting have lower capacities, and micropiles installed by pressure grouting or post-grouting (two-stage grouting process) can achieve much higher capacities. We typically recommend that micropiles be installed using pressure grouting or post-grouting methods.

Micropiles develop their resistance to axial loads primarily within the "bonded length" of the micropile (portion of the pile where grout is in direct contact with the soil and no outer casing is present). Axial resistance of micropiles is primarily derived from side friction within the bonded length. Because of their small diameters, end bearing resistance of micropiles is typically low compared to the side resistance. In our opinion, it is conservate to ignore the contribution of end bearing resistance when evaluating the axial capacity of micropiles.

4.3.5.2. Design Recommendations

We recommend that micropiles be designed using the procedures and recommendations outlined in the 2005 Federal Highway Administration (FHWA) *NHI-05-039, Micropile Design and Construction Manual*. We recommend that micropiles have a minimum embedment depth of 10 feet and have a minimum dimeter of 6 inches.

In lieu of micropile resistance charts we have provided estimates of the soil-grout bond stress values for the various strata of the design soil profile. These values are summarized in Table 5. These unit values can be used to estimate resistances of micropiles of various diameters and lengths. In our opinion, the provided values are conservative with respect to micropile design. A sacrificial test micropile could be installed at the site and a load test completed to measure the achieved soil -grout bond strength and serve as a basis for designing the production micropiles.

TABLE 5. MICROPILE DESIGN VALUES

Depth Range[1]	Layer Ultimate[2] Soil Grout Bond Stress (psi)	Layer Ultimate[2] End Bearing Stress (psi)	Layer Ultimate[2] Uplift Soil Grout Bond Stress (psi)
0 to 5	120	N/A[4]	120
5 and below	200	N/A[4]	200

Notes: [1]Depths are referenced to existing ground surface

[2]These values assume the micropiles are installed using pressure grout or post grouting installation methods. The following factors of safety should be considered when evaluating allowable resistance. Static Conditions: Skin Friction = 2.0, Uplift = 2.0. Seismic Conditions: Skin Friction = 1.5, Uplift = 1.75

4.3.5.3. Micropile Lateral Design

Because micropiles are relatively slender, single micropiles often have a relatively low lateral capacity. It is often necessary to install micropiles in groups or use battered micropiles to resist lateral loads. Permanent steel casings are also used to help increase the lateral stiffness of micropiles.

In our opinion the geotechnical properties previously provided for lateral analysis of drilled pier foundations are also suitable for evaluating micropiles. Group effects can be considered negligible for groups of micropiles spaced greater than 3 diameters apart. If micropiles will be spaced closer than what is recommended above, we should be notified and can provide additional recommendations for evaluation group effects. If micropiles are included in this project we recommend that GeoEngineers review the results of the lateral analyses to confirm that the analysis was completed in accordance with the intent of our recommendations.

4.3.5.4. Micropile Settlement

Provided micropiles are designed as recommended, we estimate that the settlement of micropiles under static loads will generally be on the order of ½-inch or less, exclusive of the elastic micropile compression. Most of this settlement should occur rapidly as loads are applied. Differential settlement between adjacent micropiles is expected to be negligible.

4.3.5.5. Micropile Testing

Micropiles should be tested to verify the installed capacity. We recommend that a minimum of one sacrificial micropile be tested to at least 2 times the design load. The sacrificial micropile should be in the same general location as production micropiles and be installed using the same means and methods as the production piles. We recommend that a minimum of 10 percent of the production piles, but at least 2, be proof-tested to 1.67 times the design load. The structural engineer may require additional or alternative testing requirements.

Micropile load testing should be completed using a load frame capable of distributing large test loads into the near surface soils without damaging existing structural elements or below ground utilities. The location of the micropile pile load tests should be reviewed during the design phase to minimize impacts to existing improvements.

4.3.5.6. Construction Considerations

The contractor should be prepared to install micropiles below the groundwater table and through soils that contain gravel, cobbles and boulders. The contractor should be prepared to use casing and/or drilling fluid to maintain drill hole stability.

Micropile layout should consider the location of existing below grade improvements. If an obstacle is encountered during micropile installation, it may be necessary to adjust the micropile location. Typically adjusting micropile locations by up to 1 to 2 pile diameters can be accommodated without significant change to the foundation design. Adjustments to the locations of micropiles during construction should be reviewed by the structural engineer.

No direct information regarding capacity (e.g., driving resistance data) of the micropiles is obtained during installation. Therefore, we recommend the installation and testing of micropiles be carefully monitored by a member from our firm who can observe and document conditions encountered.

4.4. Earth Pressures for Conventional Below-Grade Structures

4.4.1. Design Parameters

We recommend the following lateral earth pressures be used for design of conventional retaining walls and below-grade structures. These values are also appropriate for evaluating the existing shoreline bulkhead and existing building walls which we understand are retaining soils at the toe of the slope. We recommend that the undrained parameters be used for evaluating earth pressures of the existing bulkhead. Undrained pressures should also be used for evaluating the existing building walls unless a perimeter drain is installed behind the structure. For other walls, if drained design parameters are used, drainage systems must be included in the design in accordance with the recommendations presented in Section 4.3.2 below.

- Active soil pressure may be estimated using an equivalent fluid density of 35 pcf for the drained condition.
- Active soil pressure may be estimated using an equivalent fluid density of 85 pcf for the undrained condition; this value includes hydrostatic pressures.
- At-rest soil pressure may be estimated using an equivalent fluid density of 55 pcf for the drained condition.
- At-rest soil pressure may be estimated using an equivalent fluid density of 95 pcf for the undrained condition; this value includes hydrostatic pressures.
- For backfill sloping conditions up to 2H:1V, the soil pressures presented above should be increased by 15 percent.
- For seismic considerations, a uniform lateral pressure of 10H psf (where H is the height of the retaining structure or the depth of a structure below ground surface) should be added to the lateral earth pressure.
- A traffic surcharge should be included if vehicles are allowed to operate within ½ the height of the retaining walls. A typical traffic surcharge of 250 psf can be estimated by assuming an additional 2 feet of fill as part of the wall height. Other surcharge loads should be considered on a case-by-case basis. We can provide additional surcharge loads for specific loading conditions once known.

The active soil pressure condition assumes the wall is free to move laterally 0.001 H, where H is the wall height). The at-rest condition is applicable where walls are restrained from movement. The above-recommended lateral soil pressures do not include surcharge loads than those described.

Over-compaction of fill placed directly behind retaining walls or below-grade structures must be avoided. We recommend use of hand-operated compaction equipment and maximum 6-inch loose lift thickness when compacting fill within about 5 feet of retaining walls and below-grade structures.

Retaining wall foundation bearing surfaces should be prepared following Section 4.2 of this report. Provided bearing surfaces are prepared as recommended retaining wall foundations may be designed using the allowable soil bearing values and lateral resistance values presented previously.

4.4.2. Drainage

If retaining walls or below-grade structures are designed using drained parameters, a drainage system behind the structure must be constructed to collect water and prevent the buildup of hydrostatic pressure against the structure. We recommend the drainage system include a zone of free-draining backfill a minimum of 18 inches in width against the back of the wall. The drainage material should consist of coarse sand and gravel containing less that 5 percent fines based on the fraction of material passing the ¾-inch sieve. Material similar to "Gravel Backfill for Drains" per WSDOT Standard Specifications Section 9-03.12(4) is also suitable. Waffle board-type drainage mats may be considered instead of gravel provided they are protected from accumulating silt and discharge appropriately.

A perforated, rigid, smooth-walled drainpipe with a minimum diameter of 4 inches should be placed along the base of the structure within the free-draining backfill and extend for the entire wall length. The drain pipe should be metal or rigid PVC pipe and be sloped to drain by gravity. Discharge should be routed to appropriate discharge areas and designed to reduce erosion potential. Cleanouts should be provided to allow routine maintenance. We recommend roof downspouts or other types of drainage systems not be connected to retaining wall drain systems.

4.5. Stormwater Management

Stormwater infiltration facilities are not currently envisioned for this project, however use of porous surfacing or pavement systems that designed to store and transport collected water (e.g. Silva Cells) are being considered.

The site has a very low potential for stormwater infiltration. Existing soils at the site are comprised of very compact, hard, fine grained glacially consolidated soils that have very slow infiltration rates and based on the proximity to the lake, anticipated groundwater levels in level portions of the site are expected within a few feet of the ground surface. Based on these conditions we do not recommend that traditional stormwater infiltration facilities such as bioswales, infiltration trenches or permeable pavements be considered for use at this site. Infiltration in specific areas of the site where historical grading has taken place or where fill is present could be feasible, however additional studies would need to be completed to further evaluate infiltration potential.

Silva Cells are described as a modular suspended pavement system. The cells consist of square or rectangular units that include a roof and bottom supported by four "posts" at the corners. The units have opens sides and hollow interior. The cell interiors are typically filled with porous soil that allow for the storage and transportation of stormwater. While some infiltration through the base of the cells can occur, the cells can be designed assuming no infiltration and an underdrain system is typically included to discharge stormwater. Once installed the cell system can support different surfacing materials including pavers, gravel surfacing and in certain cases traditional pavements.

Silva Cells or other systems are often designed by the product manufacturer, and we recommend that they be consulted during design if these systems are being used.

To support design of stormwater collection and storage systems, the table below includes typical soil properties for common backfill materials and existing soils at the site.

TABLE 6. TYPICAL SOIL HYDRAULIC PROPERTIES

Soil Type	Referenced Gradation	Estimated Hydraulic Conductivity (inches per hour)	Porosity (n)	Void Ratio (e)
Glacial till	See Figure A-5 in Appendix A	<0.01	0.15	0.17
WSDOT Gravel Borrow	WSDOT Standard Specification 9-03.14(1)	29	0.29	0.41
WSDOT Select Borrow	WSDOT Standard Specification 9-03.14(2)	42	0.26	0.35
WSDOT Common Borrow	WSDOT Standard Specification 9-03.14(3)	20	0.24	0.32
Silty Sand with Occasional Gravel	Gravel = 4% Sand = 66% Silt = 30%	0.3	0.26	0.35
Silty Sand with Gravel	Gravel = 19% Sand = 51% Silt = 30%	0.75	0.22	0.28
Fine Sand	Sand = 99% Silt =1%	0.5	0.3	0.43

Notes:

Provided values are approximate and are based on WSDOT research report WA-RD 872.1 and our experience.

Estimates hydraulic conductivity, porosity and void ration values are based for compacted soils.

4.6. Site Development and Earthwork

We anticipate that site development and earthwork will include demolition of existing features, excavating for shallow foundations, utilities and other improvements, establishing subgrades for structures and hardscaping, and placing and compacting fill and backfill materials. We expect that site grading and earthwork can be accomplished with conventional earthmoving equipment. The following sections provide specific recommendations for site development and earthwork.

4.6.1. Clearing, Stripping and Demolition

Clearing and stripping depths will likely be on the order of 2 inches in areas currently surfaced with sod or other surface vegetation. Greater stripping depths could be required within structural areas or areas of unsuitable soils, if observed during construction. Stripped grass and sod material must not be re-used as fill.

Coarse gravel, cobbles and boulders should be expected within the glacial till soils present at the site. Accordingly, the contractor should be prepared to remove boulders and cobbles, if encountered during

grading or excavation. Boulders may be removed from the site or used in landscape areas. Voids caused by boulder removal should be backfilled with structural fill.

We recommend that existing pavements and hardscaping be completely removed from areas that will be developed. During removal of these features, disturbance of surficial soils may occur, especially if left exposed to wet conditions. Disturbed soils may require additional remediation during construction and grading. If utilities exist beneath planned structures, they should be removed and backfilled or abandoned in place.

4.6.2. Erosion and Sedimentation Control

Erosion and sedimentation rates and quantities can be influenced by construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. Implementing an Erosion and Sedimentation Control Plan will reduce the project impact on erosion-prone areas. The plan should be designed in accordance with applicable city, county and/or state standards. The plan should incorporate basic planning principles, including:

- Scheduling grading and construction to reduce soil exposure;
- Re-vegetating or mulching denuded areas;
- Directing runoff away from exposed soils;
- Reducing the length and steepness of slopes with exposed soils;
- Decreasing runoff velocities;
- Preparing drainage ways and outlets to handle concentrated or increased runoff;
- Confining sediment to the project site; and
- Inspecting and maintaining control measures frequently.

Some sloughing and raveling of exposed or disturbed soil on slopes should be expected. We recommend that disturbed soil be restored promptly so that surface runoff does not become channeled.

Temporary erosion protection should be used and maintained in areas with exposed or disturbed soils to help reduce erosion and reduce transport of sediment to adjacent areas and receiving waters. Permanent erosion protection should be provided by paving, structure construction or landscape planting.

Until the permanent erosion protection is established, and the site is stabilized, site monitoring may be required by qualified personnel to evaluate the effectiveness of the erosion control measures and to repair and/or modify them as appropriate. Provisions for modifications to the erosion control system based on monitoring observations should be included in the Erosion and Sedimentation Control Plan.

4.6.3. Temporary Excavation

Excavations deeper than 4 feet must be shored or laid back at a stable slope if workers are required to enter. Shoring and temporary slope inclinations must conform to the provisions of Title 296 Washington Administrative Code (WAC), Part N, “Excavation, Trenching and Shoring.” Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls will be required under Washington Industrial Safety and Health Act (WISHA). The contract documents should specify that the contractor is

responsible for selecting excavation and dewatering methods, monitoring the excavations for safety and providing shoring, as required, to protect personnel and structures.

The glacial till soils are hard and have some amount of cohesion that can allow them to stand vertical or near vertical for a limited amount of time. These soils can also slough unexpectedly. In general, temporary cut slopes at this site should be planned to be inclined no steeper than about 1½H to 1V (horizontal to vertical). Steeper slopes, up to about 1H to 1V can be considered within the intact glacial till deposits provided the contractor's competent person concurs with this assessment and monitors excavations in accordance with applicable regulations. This guideline assumes that all surface loads are kept at a minimum distance of at least one-half the depth of the cut away from the top of the slope and that seepage is not present on the slope face. Flatter cut slopes will be necessary where seepage occurs or if surcharge loads are anticipated. Temporary covering with heavy plastic sheeting should be used to protect slopes during periods of wet weather.

4.6.4. Permanent Slopes

If permanent slopes are necessary, we recommend they be constructed at a maximum inclination of 2H:1V. Where 2H:1V permanent slopes are not feasible, protective facings and/or retaining structures should be considered.

To achieve uniform compaction, we recommend that fill slopes be overbuilt slightly and subsequently cut back to expose well-compacted fill. Fill placement on slopes steeper than about 5H:1V should be benched into the slope face. The configuration of benches depends on the equipment being used. Bench excavations should be level and extend into the slope face.

Exposed areas should be re-vegetated as soon as practical to reduce the surface erosion and sloughing. Temporary protection should be used until permanent protection is established.

4.6.5. Groundwater Handling Considerations

In shoreline areas, groundwater should be expected in excavations that extend more than a few feet below the ground surface. Groundwater levels near the lake are expected to match water levels in Lake Washington. The glacial till soils have a very low permeability, therefore the quantity of water seeping into the excavation is expected to be low through these native soils and is expected to be manageable with isolated sumps and pumps. In areas where fill is present, groundwater handling could be more extensive. Groundwater could be especially challenging in areas where old utility trenches or pipe bedding are located and connect or otherwise provide a conduit to the shoreline of Lake Washington. If these conditions exist, the contractor might need to construct trench dams or other measures to slow groundwater flow.

Within the hillside area west of the existing buildings, we expect that perched groundwater could be encountered in shallow excavations. Perched groundwater can likley be handled adequately with sumps, pumps, and/or diversion ditches, as necessary. Groundwater seepage handling needs will typically be lower during the late summer and early fall months. Ultimately, we recommend that the contractor performing the work be made responsible for controlling and collecting groundwater encountered.

4.6.6. Surface Drainage

Surface water from roofs, pavements and landscape areas should be collected and controlled. Curbs or other appropriate measures such as sloping pavements, sidewalks and landscape areas should be used

to direct surface flow away from buildings, erosion sensitive areas and from behind retaining structures. Roof and catchment drains should not be connected to wall or foundation drains.

4.6.7. Subgrade Preparation

Subgrades that will support slab-on-grade floors, pavements, and other site features bearing on final grade should be thoroughly compacted to a uniformly firm and unyielding condition on completion of stripping/excavation and before placing structural fill. We recommend that subgrades for structures, pavements and other bearing surfaces be evaluated, as appropriate, to identify areas of yielding or soft soil. Probing with a steel probe rod or proof-rolling with a heavy piece of wheeled construction equipment are appropriate methods of evaluation.

If soft or otherwise unsuitable subgrade areas are revealed during evaluation that cannot be compacted to a stable and uniformly firm condition, we recommend that: (1) the unsuitable soils be scarified (e.g., with a ripper or farmer's disc), aerated and recompacted, if practical; or (2) the unsuitable soils be removed and replaced with compacted structural fill, as needed.

4.6.8. Subgrade Protection and Wet Weather Considerations

The wet weather season generally begins in October and continues through May in Western Washington; however, periods of wet weather can occur during any month of the year. The soils encountered in our explorations contain a significant amount of fines. Soil with high fines content is very sensitive to small changes in moisture and is susceptible to disturbance from construction traffic when wet or if earthwork is performed during wet weather. If wet weather earthwork is unavoidable, we recommend that the following steps be taken.

- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded so that areas of ponded water do not develop. Measures should be taken by the contractor to prevent surface water from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.
- Earthwork activities should not take place during periods of heavy precipitation.
- Slopes with exposed soils should be covered with plastic sheeting.
- The contractor should take necessary measures to prevent on-site soils and other soils to be used as fill from becoming wet or unstable. These measures may include the use of plastic sheeting and controlling surface water with ditches, sumps with pumps and by grading. The site soils should not be left uncompacted and exposed to moisture. Sealing the exposed soils by rolling with a smooth-drum roller prior to periods of precipitation will help reduce the extent to which these soils become wet or unstable.
- Construction traffic should be restricted to specific areas of the site, preferably areas that are surfaced with working pad materials not susceptible to wet weather disturbance.
- Construction activities should be scheduled so that the length of time that soils are left exposed to moisture is reduced to the extent practical.
- During periods of wet weather, concrete should be placed as soon as practical after preparation of the footing excavations. Foundation bearing surfaces should not be exposed to standing water. If

water pools in the base of the excavation, it should be removed before placing structural fill or reinforcing steel.

- If footing excavations are exposed to extended wet weather conditions, a lean concrete mat or a layer of clean crushed rock can be considered for foundation bearing surface protection.

4.7. Fill Materials

4.7.1. Structural Fill

The workability of material for use as structural fill will depend on the gradation and moisture content of the soil. We recommend that washed crushed rock or select granular fill, as described below, be used for structural fill during the rainy season. If prolonged dry weather prevails during the earthwork phase of construction, materials with a somewhat higher fines content may be acceptable. Weather, material use, schedule, duration exposed, and site conditions should be considered when determining the type of import fill materials purchased and brought to the site for use as structural fill.

Material used for structural fill should be free of debris, organic material, and rock fragments larger than 6 inches. For most applications, we recommend that structural fill material consist of material similar to "Select Borrow" or "Gravel Borrow" as described in Section 9-03.14 of the Washington State Department of Transportation (WSDOT) Standard Specifications.

4.7.2. Select Granular Fill/Wet Weather Fill

Select granular fill should consist of well-graded sand and gravel or crushed rock with a maximum particle size of 6 inches and less than 5 percent fines by weight based on the minus ¾-inch fraction. Organic matter, debris or other deleterious material should not be present. In our opinion, material with gradation characteristics similar to WSDOT Specification 9-03.9 (Aggregates for Ballast and Crushed Surfacing), "Gravel Backfill for Walls" as described in Section 9-03.12(2) of the WSDOT Standard Specifications, or 9-03.14 (Borrow) is suitable for use as select granular fill, provided that the fines content is less than 5 percent (based on the minus ¾-inch fraction) and the maximum particle size is 6 inches.

4.7.3. Pipe Bedding

Trench backfill for the bedding and pipe zone should consist of well-graded granular material similar to "gravel backfill for pipe zone bedding" described in Section 9-03.12(3) of the WSDOT Standard Specifications. The material must be free of roots, debris, organic matter and other deleterious material. Other materials may be appropriate depending on manufacturer specifications and/or local jurisdiction requirements.

4.7.4. Trench Backfill

Trench backfill must be free of debris, organic material and rock fragments larger than 6 inches. We recommend that import trench backfill material consist of material similar to "Select Borrow" or "Gravel Borrow" as described in Section 9-03.14 of the WSDOT Standard Specifications. Where water is present, alternative materials may need to be considered.

4.7.5. Gravel Backfill for Walls

Backfill material used within 5 feet behind retaining walls should consist of free-draining material similar to "Gravel Backfill for Walls" as described in Section 9-03.12(2) of the WSDOT Standard Specifications.

4.7.6. Capillary Break Material

Structural fill placed as capillary break material below on-grade floor slabs should consist of ¾-inch coarse aggregate with negligible sand or silt as described in Section 9-03.1(4)C Grading No. 67 of the WSDOT Standard Specifications. WSDOT Specification 9-03.9 (Aggregates for Ballast and Crushed Surfacing, Crushed Surfacing Base Course [CSBC]) may also be considered.

4.7.7. Crushed Surfacing for Pavements and Sidewalks

Structural fill placed as CSBC below pavements and sidewalks should meet the requirements for Crushed Surfacing Base Course, Section 9-03.9(3) of the WSDOT Standard Specifications.

4.7.8. On-Site Soil

Based on our subsurface explorations and experience, it is our opinion that existing site soils will likely only be suitable for fill in non-structural areas and during periods of extended dry weather. The on-site soils may be considered for use as structural fill and trench backfill, provided they can be adequately moisture conditioned, placed and compacted as recommended and do not contain organic or other deleterious material.

The native glacial till soils at the site are primarily comprised of sandy silt and are extremely moisture sensitive. These soils will be very difficult or impossible to properly compact when wet and we do not recommend they be reused as structural fill during periods of wet weather. In addition, it is possible that existing soils will be generated at moisture contents above what is optimum for compaction. In this case, the soils would need to be moisture conditioned prior to re-use. Space for drying out material during dryer weather or covering on-site materials generated during wet weather should be considered. During wetter or even slightly colder times of year, such as when temperatures get below about 60 degrees, accommodations to cover stockpiled material generated on site that will be used as structural fill should be planned.

If earthwork occurs during a typical wet season, or if the soils are persistently wet and cannot be dried back due to prevailing wet weather conditions, we recommend the use of imported select granular fill, as described above.

4.7.9. Fill Placement and Compaction

To obtain proper compaction, fill soil should be compacted near optimum moisture content and in uniform horizontal lifts. Lift thickness and compaction procedures will depend on the moisture content and gradation characteristics of the soil and the type of equipment used. The maximum allowable moisture content varies with the soil gradation and should be evaluated during construction. Generally, 12-inch loose lifts are appropriate for steel-drum vibratory roller compaction equipment. Compaction should be achieved by mechanical means. During fill and backfill placement, sufficient testing of in-place density should be conducted by a representative of GeoEngineers to check that adequate compaction is being achieved.

4.7.9.1. Area Fills and Pavement Bases

Fill placed to raise site grades and materials under pavements and structural areas should be placed on subgrades prepared as previously recommended. Fill material placed below structures and footings should be compacted to at least 95 percent of the theoretical maximum dry density (MDD) per ASTM International (ASTM) D 1557. Fill material placed shallower than 2 feet below pavement sections should be compacted

to at least 95 percent of the MDD. Fill placed deeper than 2 feet below pavement sections should be compacted to at least 90 percent of the MDD. Fill material placed in landscaping areas should be compacted to a firm condition that will support construction equipment, as necessary, typically around 85 to 90 percent of the MDD.

4.7.9.2. Backfill Behind Below-Grade Structures

Backfill behind retaining walls or below-grade structures should be compacted to between 90 and 92 percent of the MDD. Overcompaction of fill placed directly behind below-grade structures should be avoided. We recommend use of hand-operated compaction equipment and maximum 6-inch loose lift thickness when compacting fill within about 5 feet behind below-grade structures.

4.7.9.3. Trench Backfill

For utility excavations, we recommend that the initial lift of fill over the pipe be thick enough to reduce the potential for damage during compaction, but generally should not be greater than about 18 inches above the pipe. In addition, rock fragments greater than about 1 inch in maximum dimension should be excluded from this lift.

Trench backfill material placed below structures and footings should be compacted to at least 95 percent of the MDD. In paved areas, trench backfill should be uniformly compacted in horizontal lifts to at least 95 percent of the MDD in the upper 2 feet below subgrade. Fill placed below a depth of 2 feet from subgrade in paved areas must be compacted to at least 90 percent of the MDD. In non-structural areas, trench backfill should be compacted to a firm condition that will support construction equipment, as necessary.

5.0 LIMITATIONS

We have prepared this report for City of Mercer Island Public Works, for the Luther Burbank Park Upland Improvement Project. City of Mercer Island Public Works may distribute copies of this report to owner and owner's authorized agents and regulatory agencies as may be required for the Project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices for geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty, express or implied, applies to the services or this report.

Please refer to Appendix B titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

FIGURES

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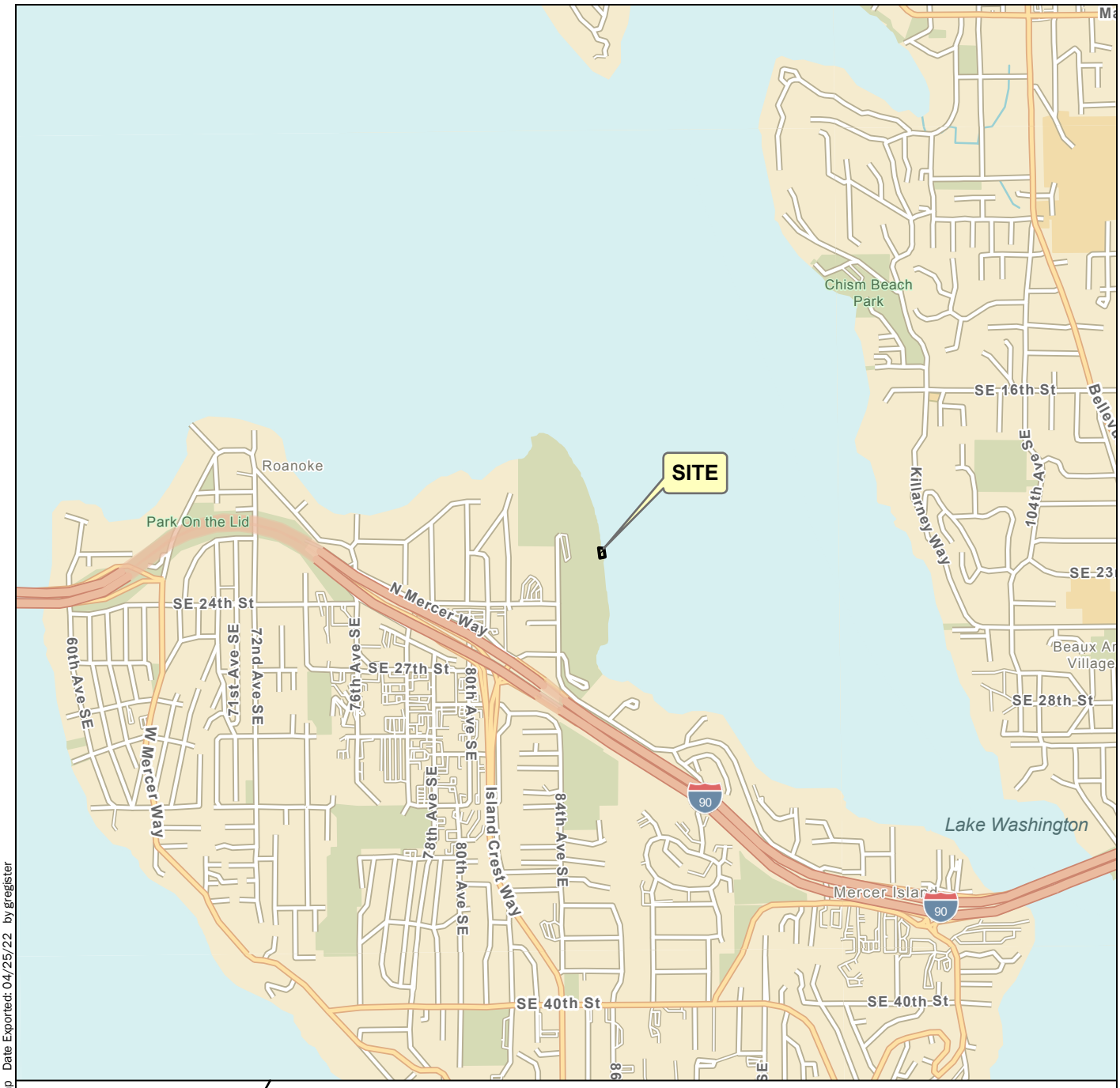

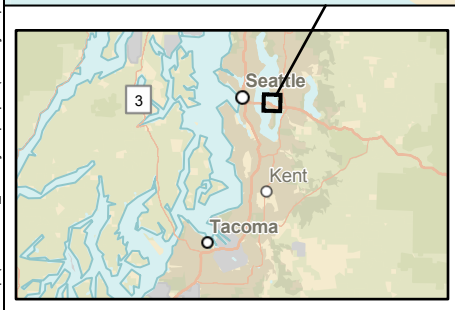

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Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Luther Burbank Park Upland Improvements
Mercer Island Washington

GeoEngineers

Figure 1

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Legend

B-1 Boring by GeoEngineers, Inc., 2022

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Aerial from Google Earth Pro dated 08/14/2020.

Projection: Washington State Plane, North Zone, NAD83, US Foot

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Site Plan

Luther Burbank Park Upland Improvements
Mercer Island Washington

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Figure 2

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APPENDICES

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APPENDIX A
Subsurface Explorations and Laboratory Testing

APPENDIX A
SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface Explorations

General

Soil conditions at the project site were explored by advancing three borings on April 1, 2022. The approximate locations of our explorations and shown on Figure 2. The explorations were located in the field using a GPS device. The locations of the explorations shown on the Site Plan (Figure 2) should be considered approximate.

Soil Borings

Soil borings were advanced to between 11 feet and 13.5 feet below ground surface (bgs) using a track-mounted hollow-stem auger drill rig equipment and operators under subcontract to GeoEngineers. The explorations were continuously monitored by a representative from our firm who examined and classified the soil encountered, obtained representative soil samples, and maintained a detailed log of the explorations. Soil encountered in the borings was classified in general accordance with ASTM International (ASTM) D 2488 and the classification chart listed in Key to Exploration Logs, Figure A-1. Logs of the borings are presented in Figures A-2 through A-4. The logs are based on interpretation of the field and laboratory data and indicate the depth at which we interpret subsurface materials or their characteristics to change, although these changes might actually be gradual.

Soil samples were obtained from the borings at approximate 2.5- to 5-foot-depth intervals using either a 2-inch, outside-diameter, standard split-spoon sampler (Standard Penetration Test [SPT]) in general accordance with ASTM D 1586 or using a larger 2.4-inch-diameter sampler. The samplers were driven into the soil using a 140-pound rope and cathead hammer, free-falling 30 inches. The number of blows required to drive the samplers each of three, 6-inch increments of penetration were recorded in the field. The sum of the blow counts for the final 12 inches of penetration, unless otherwise noted, is reported on the boring logs.

Laboratory Testing

Soil samples obtained from the borings and test pits were returned to our laboratory for further examination and testing. The testing completed on each sample is presented in the corresponding boring log or test pit log.

Grain-size analyses were performed on selected soil samples in general accordance with ASTM Test Method D 6913. This test provides a quantitative determination of the distribution of particle sizes in soils. Figure A-5 presents the results of the grain-size analyses.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel / Dames & Moore (D&M)

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

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Figure A-1

Drilled Start 4/1/2022 End 4/1/2022	Total Depth (ft) 13.5	Logged By LSP Checked By BEL	Driller Geologic Drill Technologies	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 23 Vertical Datum NAVD88		Hammer Data Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Mini Track Rig	
Easting (X) 1297163 Northing (Y) 218603		System Datum WA State Plane South NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						ML	Dark brown sandy silt with organics (stiff, moist) (sod)			
							ML	Gray sandy silt with occasional oxidation staining (hard, moist) (glacial till)			
20		18	34		1 SA				13	67	
	5	18	55		2						
15		11	50/5"		3						
							SM	Gray silty fine sand (very dense, moist)			
	10	6	50/6"		4						
		18	71		5 SA		ML	Gray silt with sand (hard, moist)	16	74	
10		18	86		6						

Practical drilling refusal at 13½ feet

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Esri Survey. Vertical approximated based on Project Survey.

Date:4/21/22 Path:P:\0\0817024\GINT\0817024O1.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Log of Boring B-1

GeoEngineers

Project: Luther Burbank Park Upland Improvements
Project Location: Mercer Island, Washington
Project Number: 0817-024-01

Figure A-2
Sheet 1 of 1

Drilled Start 4/1/2022 End 4/1/2022	Total Depth (ft) 11	Logged By LSP Checked By BEL	Driller Geologic Drill Technologies	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 20 Vertical Datum NAVD88		Hammer Data Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Mini Track Rig	
Easting (X) 1297149 Northing (Y) 218583		System Datum WA State Plane South NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						ML	Dark brown sandy silt with organics (stiff, moist) (sod)			
							ML	Gray silt with sand and occasional gravel (hard, moist) (glacial till)			
		18	65		1 SA				14	71	
15	5	18	58		2						
		17	75/11"		3						
10	10		50/6"		4						

Practical drilling refusal at 11 feet

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Esri Survey. Vertical approximated based on Project Survey.

Log of Boring B-2

GeoEngineers

Project: Luther Burbank Park Upland Improvements
Project Location: Mercer Island, Washington
Project Number: 0817-024-01

Figure A-3
Sheet 1 of 1

Drilled Start 4/1/2022 End 4/1/2022	Total Depth (ft) 11.5	Logged By LSP Checked By BEL	Driller Geologic Drill Technologies	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 20 Vertical Datum NAVD88		Hammer Data Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Mini Track Rig	
Easting (X) 1297142 Northing (Y) 218689		System Datum WA State Plane South NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CC	Approximately 6 inches concrete			
		12	14		1		SP-SM	Approximately 4 inches gray fine to coarse sand with silt (medium dense, moist) (base course)			
							ML	Gray sandy silt with gravel (stiff, moist) (fill)			
		15	WOH		2						No sheen, slight odor
								Becomes wet			Perched groundwater observed at approxiamtely 3 feet during drilling
15	5	16	46		3						Slight sheen, slight odor
							ML	Light brown sandy silt (hard, moist) (glacial till)			
		18	60		4						No sheen, no odor
10	10	16	60		5						No sheen, no odor

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Esri Survey. Vertical approximated based on Project Survey.

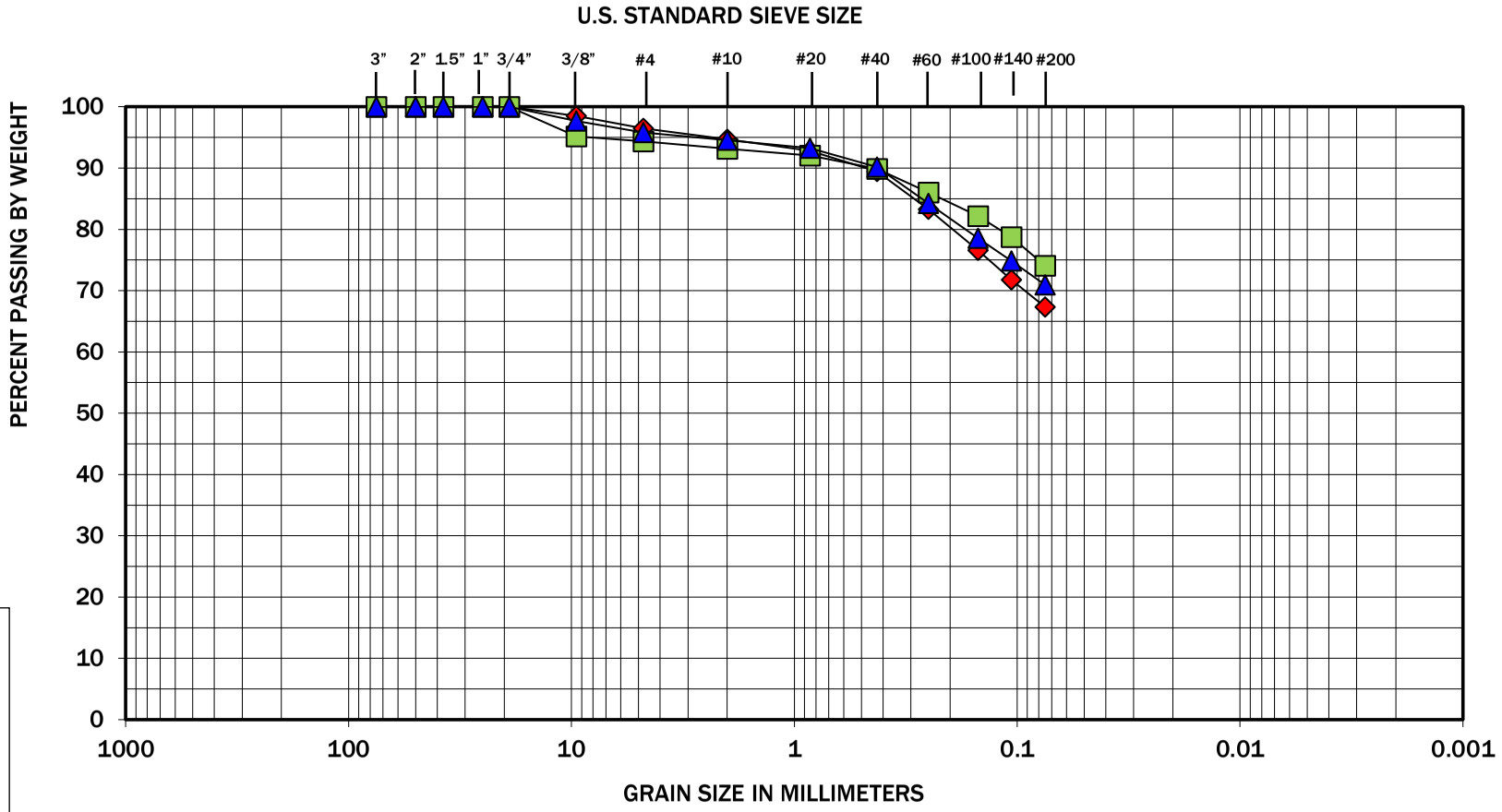
Date:4/21/22 Path:P:\0\0817024\GINT\0817024O1.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Log of Boring B-3

GeoEngineers

Project: Luther Burbank Park Upland Improvements
Project Location: Mercer Island, Washington
Project Number: 0817-024-01

Figure A-4
Sheet 1 of 1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	B-1	2.5	13	Sandy silt (ML)
■	B-1	10.5	16	Silt with sand (ML)
▲	B-2	2.5	14	Silt with sand (ML)

Sieve Analysis Results

Luther Burbank Park Upland Improvements
Mercer Island, Washington

GeoEngineers

Figure-A-5

AASHTO ACCREDITED

The grain size analysis results were obtained in general accordance with ASTM C 136. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

APPENDIX B
Report Limitations and Guidelines for Use

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for City of Mercer Island Public Works and for the Project(s) specifically identified in the report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our Agreement with City of Mercer Island Public Works dated January 4, 2022 and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is based on a Unique Set of Project-Specific Factors

This report has been prepared for the Luther Burbank Upland Improvements Project in Mercer Island, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;

1 Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Environmental Concerns are Not Covered

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Information Provided by Others

GeoEngineers has relied upon certain data or information provided or compiled by others in the performance of our services. Although we use sources that we reasonably believe to be trustworthy, GeoEngineers cannot warrant or guarantee the accuracy or completeness of information provided or compiled by others.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

We have developed the following recommendations based on data gathered from subsurface investigation(s). These investigations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this

report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field

GeoEngineers

APPENDIX B

Environmental Construction Contingency Plan for Soil Management

Environmental Construction Contingency Plan for Soil Management

Luther Burbank Park
Mercer Island, Washington

for
City of Mercer Island

December 29, 2022

GeoEngineers
Earth Science + Technology

Environmental Construction Contingency Plan for Soil Management

Luther Burbank Park
Mercer Island, Washington

for
City of Mercer Island

December 29, 2022

GeoEngineers

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Environmental Construction Contingency Plan for Soil Management

Luther Burbank Park
Mercer Island, Washington

File No. 0817-024-01

December 29, 2022

Prepared for:

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1.0 INTRODUCTION

This report presents the Environmental Construction Contingency Plan (ECCP) which includes soil handling recommendations related to the planned upland improvement construction activities at Luther Burbank Park located at 2040 84th Avenue SE in Mercer Island, Washington. Our understanding of the project is based on our communications with you and project partners, KPFF and Swenson Say Faget, and review of the 100 percent design development upland improvement plans (dated August 12, 2022).

The proposed upland improvements for Luther Burbank Park include replacement of existing pavement with low impact surfacing such as permeable pavers, SilvaCells, or other similar products intended to limit stormwater runoff, construction of a new Americans with Disability Act (ADA) accessible pedestrian ramp leading from existing trails to a second-story rooftop classroom area, and a seismic retrofit of the existing boiler plant building.

Multiple environmental investigations and remedial actions have been completed at the Luther Burbank Park site related to historic releases from underground storage tanks (USTs) formerly in use on the property. The Washington State Department of Ecology (Ecology) issued a no further action (NFA) opinion for the Site following the removal of diesel-contaminated soil in 2003[1]. Environmental investigations completed outside the remedial action areas which document soil conditions left in place include the GeoEngineers investigation in 2022 and the Hart Crowser investigation in 2002. The soil chemical analytical data from these investigations form the basis for this ECCP to coordinate the appropriate management of soil and groundwater during project construction, as described in Sections 2.0, 3.0 and 5.0 below.

The portion of Luther Burbank Park where the uplands improvements project is taking place is herein referred to as the "project site" or just "the site" and is shown relative to surrounding physical features on the Vicinity Map, Figure 1. The boundaries of the project site and the previous exploration locations used to characterize subsurface conditions are shown on the Site Plan, Figure 2.

2.0 BACKGROUND

The project site is located on the shoreline of Lake Washington approximately in the geographical center of the parks' shoreline frontage. Development at the site includes the historic brick boiler plant building, a brick restroom building that connects to the southwest corner of the boiler plant, a concrete shoreline bulkhead, concrete and brick paved sidewalks and landscaped areas. Two decommissioned USTs (former diesel tanks) are in place beneath a portion of the restroom building and the connected plaza (Figure 2).

2.1. Environmental Soil and Groundwater Investigations

Subsurface soil conditions were evaluated as a part of two focused soil investigations near the USTs at the project site. The environmental sampling programs are summarized below. The approximate borings locations are shown on Figure 2.

[1] The NFA status of the site is summarized in Ecology's comment letter regarding the project's State Environmental Policy Act (SEPA) submittal, dated December 15, 2022. Ecology's letter is attached as Appendix A for reference.

2.1.1. Hart Crowser Focused Soil and Groundwater Investigation (HC 2002)

Hart Crowser completed a focused soil and groundwater assessment consisting of eight direct-push borings (P-1 through P-8) completed between Lake Washington and the USTs at depths between 5 and 10 feet below ground surface (bgs). Two of the borings (P-1 and P-5) were completed as permanent monitoring wells.

A total of eleven discrete and composite soil samples collected from the eight borings at depths between 1 and 10 feet bgs were submitted for laboratory chemical analysis for diesel- and oil-range total petroleum hydrocarbons by Northwest Method NWTPH-Dx. Chemical analytical data results are summarized in Table 1 and are further discussed below (Section 2.2). Copies of the relevant pages of the Hart Crowser report are presented in Appendix B.

2.1.2. GeoEngineers Focused Soil Investigation (GEI 2022)

GeoEngineers completed focused sampling and analysis at the project site that included the sampling of soil during the drilling of one hollow-stem auger boring (B-3) located east of the USTs during a 2022 geotechnical investigation[2]. The goal of the environmental investigation was to assess and document current soil conditions near the USTs where soil impacted with diesel had previously been identified by Hart Crowser in 2002. The soil sampling was completed on April 1, 2022.

Three discrete soil samples from boring B-3 were collected at depths between 2 and 10 feet bgs. One composite sample was collected from soil between 0 and 10 feet bgs. The soil samples were submitted for laboratory analyses consistent with previously identified contaminants of concern for the property (diesel-related contaminants) and for waste characterization purposes. Soil sample chemical analysis included the following:

- Gasoline-, diesel- and oil-range total petroleum hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx;
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021B;
- Total and dissolved Resource Conservation and Recovery Act (RCRA) metals by U.S. EPA Methods 200.8/7470A; and
- Polycyclic aromatic hydrocarbons (PAHs) including carcinogenic PAHs (cPAHs) by EPA method 8270D/SIM.

Chemical analytical results are summarized in Table 1 and are further discussed below (Section 2.2). Copies of the chemical analytical laboratory data are presented in Appendix C.

2.2. Subsurface Conditions

2.2.1. Soil Conditions and Chemical Analytical Results

Based on the observations made during drilling and soil sampling of GeoEngineers boring B-3, subsurface soil conditions at the site consist of fill overlying glacial till. Boring B-3 was advanced within the concrete

[2] GeoEngineers geotechnical investigation is summarized under separate cover in the final Geotechnical Engineering Services report for the project dated August 5, 2022.

paved sidewalk area near the USTs where the concrete thickness was approximately 6 inches. The concrete was underlain by about 4 inches of base course material. Below the base course, material interpreted to be fill was observed extending to about 7 feet bgs. Underlaying the fill was glacial till. The observed fill generally consisted of stiff sandy silt which is interpreted to be reworked native soil. The glacial till generally consisted of hard silt with sand and sandy silt with occasional gravel.

Fifteen soil samples were collected at depths between approximately 0 and 10 feet bgs as a part of the subsurface investigations. The soil sample chemical analytical results are summarized in Table 1 and are discussed below relative to the applicable Ecology Model Toxics Control Act (MTCA) soil cleanup levels.

- **Analyte(s) Detected Greater Than MTCA Method A Cleanup Levels:** There were no samples with analytes detected at concentrations greater than MTCA Method A Cleanup Levels.
- **Analyte(s) Detected Less Than MTCA Method A Cleanup Levels:** Diesel- and lube oil-range total petroleum hydrocarbons were detected at concentrations greater than the laboratory reporting limits in the samples from boring B-3 at depths of 2 and 10 feet bgs and in the samples from borings P-2, P-3, P-4, P-7, and P-8 at depths ranging from 1 to 10 feet bgs. Naphthalenes, PAHs including cPAHs, and select metals (barium and chromium) were also detected at concentrations greater than the laboratory reporting limits in the samples from B-3.
- **Analyte(s) Not Detected:** Gasoline-range total petroleum hydrocarbons, BTEX, and metals (other than barium and chromium) were not detected at concentrations greater than the laboratory reporting limits in the soil samples analyzed.

The findings of the soil sampling do not indicate widespread impacts to soil at the project site. However, soil classified as "Impacted" (based on the detected concentrations of the various analytes less than the MTCA cleanup levels or background for metals) may be generated during the planned excavation activities, especially in the excavation areas near the USTs and former borings where contaminants of concern (analytes) were detected as described above. Impacted soil requires special handling and appropriate treatment and/or disposal if excavated and transported from the property. Section 3.0 outlines the general soil classifications for handling and disposal purposes.

2.2.2. Groundwater Conditions and Chemical Analytical Results

Two groundwater samples were collected from monitoring wells P-1 and P-5 as a part of the 2002 Hart Crowser subsurface investigations at the project site. Groundwater samples were analyzed for diesel- and lube-oil range total petroleum hydrocarbons by Northwest Method NWTPH-Dx. Diesel- and lube-oil range total petroleum hydrocarbons were not detected at concentrations greater than the laboratory reporting limits in either of the two samples analyzed.

The findings of the groundwater sampling do not indicate groundwater impacts at the project site. However, considerations for construction wastewater handling during construction activities (if applicable to the project) are summarized in Section 5.0.

3.0 SOIL CATEGORIES AND DEFINITIONS

Based on the soil sampling and analysis completed during the environmental investigations, the following categories will be used for classification and management of project site soil. Definitions of contaminated

soil and natural background concentrations are provided in Washington Administrative Code (WAC) 173-350-100 for solid waste purposes.

3.1. Non-regulated Soil

Soil is considered "non-regulated" and acceptable for unrestricted end-use if the following characteristics are true:

- Contaminants are not detected at concentrations greater than the laboratory reporting limits for any analyte other than metals.
- Metals are detected at concentrations less than the natural background levels for the Puget Sound region (Ecology 1994). In the cases of barium, selenium and silver where no natural background level has been established for the Puget Sound, soil is considered "non-regulated" if the detected concentrations are less than the Ecology MTCA Method A or B Cleanup Levels for Unrestricted Land Uses.
- Physical evidence of contamination (sheen, odor, staining, etc.) is not observed.

Based on the results of the soil sampling and analysis and use history of the project site, soil at the site within portions of the planned excavation west of the UST area may be classified as non-regulated although characterization soil sampling of the excavated soil should be conducted to confirm that the soil meets disposal criteria if the soil is being transported and disposed off-site. There are no special handling or end-use requirements for soil that meets the non-regulated soil criteria.

3.2. Impacted Soil

Soils are considered "impacted" and should be transported to a controlled and permitted landfill, or owner approved fill location if:

- Contaminant concentrations for any analyte are greater than the laboratory reporting limits but are less than the MTCA cleanup levels (Method A or Method B if Method A is not established).
- Metals are detected at concentrations greater than natural background levels for the Puget Sound region (Ecology 1994) but less than MTCA Method A or B cleanup levels.
- Physical evidence of contamination (sheen, odor, staining) is observed.

Impacted soil was identified at locations B-3, P-2, P-3, P-4, P-7, P-8 at depths ranging from 1 to 10 feet bgs. We expect soil excavated from portions of the site, particularly directly north and east of the former USTs, will be classified as impacted based on the existing soil data. Soil excavated near the locations where soil impacts have been previously identified and in close proximity to the USTs will likely require special handling and disposal. Any soil planned for removal from the site should be sampled to confirm that the material meets the applicable disposal criteria.

3.3. Contaminated Soil

For the purposes of soil handling for the Luther Burbank Park upland improvements project construction activities, soils are considered "contaminated" and not acceptable for unrestricted end-use if one or more of the following characteristics are present:

- Contaminant concentrations for any analyte are greater than the MTCA cleanup levels.
- Physical evidence of contamination (sheen, odor, staining) is observed.

Contaminated soil was not identified based on the soil data collected from the site to date.

4.0 DISCOVERY OF UNEXPECTED POTENTIALLY CONTAMINATED/IMPACTED SOIL OR USTS

GeoEngineers will not be on site providing environmental construction oversight for the Luther Burbank Park upland improvements project. Therefore, it is the Contractor's responsibility to identify potentially contaminated/impacted soil as described below. Excavated soil from any location should be considered to be impacted, and potentially contaminated, if it exhibits one or more of the following physical characteristics:

- Staining;
- Petroleum hydrocarbon-like odors;
- A moderate or heavy sheen when placed in contact with water;
- Significant concentrations of organic vapors are detected using headspace field screening methods; and/or
- Significant quantities of debris including but not limited to wood waste, old construction materials, coal or other deleterious material.

If soil exhibits one or more of the above characteristics, or if an undocumented UST, or other remnant infrastructure, is discovered, the Contractor should notify the Owner and GeoEngineers immediately for further evaluation prior to removal and/or disposal. A "Potentially Contaminant Impacted Soil Notification Form" is presented in Appendix D. Upon discovery of potentially contaminated/impacted soil or an unanticipated condition indicating the potential for environmental contamination, the Contractor should refer to this ECCP for project contacts to notify and should collect/document the location and type of concern, and actions taken to address the potentially contaminated soil, UST, or other condition.

4.1. Disposal/Recycling Facilities

Any impacted or contaminated soil generated from excavation activities at or surrounding locations B-3, P-2, P-3, P-4, P-7, P-8 or from potential future discoveries will be segregated for transport to the Owner-selected disposal facility after approval is granted by the facility. Potential disposal/recycling facilities include, but are not limited to the following:

- Republic Service's Roosevelt Landfill located in Klickitat County, Washington. A transfer station for this landfill is located in Seattle, Washington.
- Waste Management's Columbia Ridge Landfill in Arlington, Oregon. A transfer station for this landfill is located in Seattle, Washington.
- Cadman's Petroleum Contaminated Soil Treatment Facility in Everett, Washington.

GeoEngineers is available to discuss the pros and cons of each of these disposal facilities upon request.

5.0 CONSTRUCTION DEWATERING EFFLUENT HANDLING

Based on the site's location near the bank of Lake Washington, and our water level observations in permanent monitoring wells P-1 and P-5 located approximately 5 feet from the eastern edge of the shoreline bulkhead, groundwater is expected to be within approximately 2 feet of ground surface and will fluctuate seasonally with the lake level.

If the planned excavations will require dewatering, the Contractor should prepare a groundwater management plan with a plan for the dewatering including appropriate containment, testing, and treatment methods for recovery of water that collects in the excavation. We assume that the Contractor will request a Construction Dewatering permit (Discharge Authorization) from King County to dispose of dewatering effluent if needed. We further assume that, if needed, the Contractor will have a system/equipment on site to store, test, and treat groundwater prior to discharge off-site. GeoEngineers can assist in providing information related to groundwater sampling and testing completed on the parcel and/or support the Contractor in the sampling and testing of groundwater for the presence of hazardous chemicals to comply with discharge permits upon request.

It is important to obtain water quality samples for chemical analytical testing at the influent (upstream) and effluent (discharge) ends of the system. These test results will show analyte/contaminant concentrations in both untreated (upstream) water and settled/treated water prior to the point of discharge to the sewer system. Water quality testing results will need to be compared to the specific discharge limits that will be listed in the Discharge Authorization for the project. The Contractor will need to ensure that the settled/treated dewatering effluent meets the limits listed in the Discharge Authorization.

Based on the groundwater sampling and analysis summarized in this report, dewatering effluent may not require treatment depending on the observed concentrations of contaminants and discharge permit criteria, but any water collected or removed during construction activities should be profiled for appropriate disposal.

6.0 DISCOVERY OF UNEXPECTED CONTAMINATED/IMPACTED GROUNDWATER

GeoEngineers will not be on site to evaluate groundwater conditions during construction activities. Therefore, it is the Contractor's responsibility to identify potentially contaminated/impacted groundwater as described below:

- Petroleum hydrocarbon-like odors;
- A moderate or heavy sheen; and/or
- Turbidity that may result in a discharge exceedance.

7.0 CONTACT INFORMATION

If unexpected potentially contaminated soil, or other conditions of potential environmental concern are discovered during construction activities, the Contractor should notify GeoEngineers and the owner (City of Mercer Island Public Works) as soon as possible. The following table presents those contacts as well as other relevant project contacts who may be contacted as back up.

RELEVANT PROJECT CONTACTS

Name	Title	Cell Phone	Office Phone	Email
Owner – City of Mercer Island Public Works				
Paul West	CIP Project Manager	206.275.7833	206.677.1028	Paul.West@mercergov.org
Environmental Consultant – GeoEngineers				
Sydney Bronson	Environmental Engineer	509.951.9058	425.861.6086	sbronson@geoengineers.com
Tim Syverson	Environmental Associate	206.605.9236	206.448.4197	tsyverson@geoengineers.com

8.0 LIMITATIONS

We have prepared this report for the exclusive use of the City of Mercer Island Public Works and their authorized agents. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Please refer to Appendix E titled "Report Limitations and Guidelines for Use," for additional information pertaining to use of this report.

9.0 REFERENCES

Camp Dresser & McKee, Inc. (CDM 2002). Final Report – Soil Remediation, Former Steam Plant – Luther Burbank Park, Mercer Island, Washington. Dated November 7, 2002.

Cardinal Architecture (Cardinal 2022). Luther Burbank Park Boiler Building, 100% DD, Luther Burbank Park, Mercer Island, Washington. Dated August 12, 2022.

GeoEngineers, Inc. (GEI 2022). Geotechnical Engineering Services for Luther Burbank Park Upland Improvements, Mercer Island, WA. Dated August 5, 2022.

Hart Crowser (Hart Crowser 2002). Excerpt from Oil Tank Monitoring Report, Luther Burbank Park, Mercer Island, Washington. Dated June 2002.

Washington State Department of Ecology (Ecology 1994). Natural Background Soil Metals Concentrations in Washington State. Toxics Cleanup Program, Department of Ecology. Publication #94-115. October 1994.

Washington State Department of Ecology (Ecology 2013). Model Toxics Control Act Regulation and Statute. Publication No. 94-06. Revised 2013.

TABLES

GeoEngineers

Table 1

Summary of Soil Chemical Analytical Data

Luther Burbank Park: Upland Improvements
Mercer Island, Washington
GeoEngineers Project # 0817-024-01

Investigation Name	GeoEngineers, 2022[1]				Hart Crowser, 2002[2]											MTCA Method A Cleanup Level (mg/kg)[3]	Natural Background (mg/kg)[4]
Boring Identification	B-3				P-1	P-2		P-3		P-4	P-5	P-6	P-7	P-8			
Sample Identification	B-3-2	B-3-5	B-3-10	B-3-0-10	P-1 S-1	P-2 S-2	P-2 S-3	P-3 S-1	P-3 S-2	P-4 S-2a	P-5 S-2	P-6 S-2	P-7 S-1	P-8 S-1	P-8 S-2		
Sample Date	4/1/2022	4/1/2022	4/1/2022	4/1/2022	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002		
Sample Type	Discrete	Discrete	Discrete	Composite	Composite	Composite	Discrete	Composite	Composite	Discrete	Composite	Composite	Composite	Composite	Composite		
Sample Depth (feet bgs)	2	5	10	0 to 10	1 to 5	4 to 8	8 to 10	1 to 4	4 to 7.5	4 to 5	4 to 8	4 to 8	1 to 4	1 to 4	4 to 8		
Total Petroleum Hydrocarbons[5] (mg/kg)																	
Gasoline-range	6.7 U	6.4 U	5.2 U	5.3 U	--	–	–	–	--	--	–	–	–	--	--	30	NE
Diesel-range	31 U	30 U	**150**	29 U	20 U	20 U	**42**	**750**	20 U	**610**	20 U	20 U	**20**	**1,200**	20 U	2,000	NE
Lube oil-range	**130**	60 U	**110**	58 U	50 U	50 U	50 U	**460**	50 U	50 U	50 U	50 U	50 U	**290**	50 U	2,000	NE
VOCs[6] (mg/kg)																	
Benzene	0.020 U	0.020 U	0.020 U	0.020 U	–	–	–	--	--	–	–	–	--	--	–	0.03	NE
Toluene	0.067 U	0.064 U	0.052 U	0.053 U	–	–	–	--	--	–	–	–	--	--	–	7	NE
Ethylbenzene	0.067 U	0.064 U	0.052 U	0.053 U	–	–	–	--	--	–	–	--	--	–	–	6	NE
m,p-Xylene	0.067 U	0.064 U	0.052 U	0.053 U	--	–	–	--	--	–	–	--	--	–	–	NE	NE
o-Xylene	0.067 U	0.064 U	0.052 U	0.053 U	–	–	–	--	--	–	–	–	--	--	–	NE	NE
Total Xylenes	ND	ND	ND	ND	–	–	--	--	–	–	–	--	--	--	–	9	NE
Metals[7] (mg/kg)																	
Arsenic	13 U	12 U	12 U	12 U	--	–	–	–	--	--	–	–	--	--	–	20	7
Barium	**37**	**56**	**73**	**80**	–	–	–	--	--	–	–	--	--	--	–	16,000	NE
Cadmium	0.63 U	0.60 U	0.58 U	0.58 U	–	–	--	--	–	–	–	--	--	–	–	2.0	1
Total Chromium	**23**	**34**	**35**	**44**	–	–	--	--	–	–	–	--	--	–	–	2,000[8]	48
Hexavalent Chromium	–	–	–	1.2 U	--	–	–	--	--	–	–	–	--	--	–	19	NE
Lead	**12**	6.0 U	5.8 U	5.8 U	–	–	–	--	--	–	–	–	--	--	–	250	24
Mercury	0.31 U	0.30 U	0.29 U	0.29 U	–	–	–	--	--	–	–	–	--	--	–	2	0.07
Selenium	13 U	12 U	12 U	12 U	–	–	--	--	–	–	–	--	--	–	–	400	NE
Silver	1.3 U	1.2 U	1.2 U	1.2 U	–	–	--	--	–	–	–	--	--	–	–	400	NE
Naphthalenes[9] (mg/kg)																	
Naphthalene	**0.011**	0.0079 U	0.0078 U	0.0077 U	–	–	–	--	--	–	–	--	--	–	–	5	NE
1-Methylnaphthalene	**0.01**	0.0079 U	**0.55**	0.0077 U	–	–	–	--	--	–	–	--	--	–	–		
2-Methylnaphthalene	**0.028**	0.0079 U	**0.51**	0.0077 U	–	–	--	--	–	–	–	--	--	–	–		
Total Naphthalenes[10]	**0.049**	ND	**1.064**	ND	--	–	–	--	--	–	–	–	--	--	–		
PAHs[11] (mg/kg)																	
Acenaphthylene	**0.014**	0.0079 U	**0.021**	0.0077 U	--	–	–	–	--	--	--	–	–	–	--	NE	NE
Acenaphthene	**0.031**	0.0079 U	**0.13**	0.0077 U	--	–	–	–	--	--	--	–	–	–	--	4,800	NE
Fluorene	**0.042**	0.0079 U	**0.11**	0.0077 U	--	--	–	–	–	--	--	–	–	–	--	3,200	NE
Phenanthrene	**0.049**	0.0079 U	**0.26**	0.0077 U	–	--	--	–	–	–	--	--	–	–	–	NE	NE
Anthracene	**0.0096**	0.0079 U	**0.054**	0.0077 U	–	--	--	--	–	–	–	--	--	–	–	NE	NE
Fluoranthene	**0.053**	0.0079 U	**0.021**	0.0077 U	–	--	--	--	–	–	–	--	--	–	–	3,200	NE
Pyrene	**0.065**	0.0079 U	**0.053**	0.0077 U	–	–	--	--	–	–	–	--	--	–	–	2,400	NE
Benzo[g,h,i]perylene	**0.020**	0.0079 U	0.0078 U	0.0077 U	–	–	--	--	--	–	–	--	--	–	–	NE	NE

Investigation Name	GeoEngineers, 2022[1]				Hart Crowser, 2002[2]											MTCA Method A Cleanup Level (mg/kg)[3]	Natural Background (mg/kg)[4]
Boring Identification	B-3				P-1	P-2		P-3		P-4	P-5	P-6	P-7	P-8			
Sample Identification	B-3-2	B-3-5	B-3-10	B-3-0-10	P-1 S-1	P-2 S-2	P-2 S-3	P-3 S-1	P-3 S-2	P-4 S-2a	P-5 S-2	P-6 S-2	P-7 S-1	P-8 S-1	P-8 S-2		
Sample Date	4/1/2022	4/1/2022	4/1/2022	4/1/2022	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002	06/2002		
Sample Type	Discrete	Discrete	Discrete	Composite	Composite	Composite	Discrete	Composite	Composite	Discrete	Composite	Composite	Composite	Composite	Composite		
Sample Depth (feet bgs)	2	5	10	0 to 10	1 to 5	4 to 8	8 to 10	1 to 4	4 to 7.5	4 to 5	4 to 8	4 to 8	1 to 4	1 to 4	4 to 8		
cPAHs[11] (mg/kg)																	
Benzo (a) anthracene (TEF 0.1)	**0.025**	0.0079 U	**0.027**	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
Chrysene (TEF 0.01)	**0.026**	0.0079 U	**0.037**	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
Benzo (b) fluoranthene (TEF 0.1)	**0.026**	0.0079 U	0.0078 U	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
0.1)	**0.0086**	0.0079 U	0.0078 U	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
Benzo (a) pyrene (TEF 1)	**0.026**	0.0079 U	**0.011**	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
0.1)	**0.018**	0.0079 U	0.0078 U	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
0.1)	0.0084 U	0.0079 U	0.0078 U	0.0077 U	--	--	--	--	--	--	--	--	--	--	--	NE	NE
only)	**0.034**	ND	**0.014**	ND	--	--	--	--	--	--	--	--	--	--	--	0.1	NE

Notes:

[1] Chemical analysis performed by OnSite Environmental, Inc. of Redmond, Washington.

[2] Chemical analysis performed by ESN Northwest Laboratory, of Olympia, Washington.

[3] MTCA Method B criteria is listed if MTCA Method A cleanup level is not established.

[4] Natural background criteria established for the Puget Sound region (Ecology 1994).

[5] Total petroleum hydrocarbons (TPH) were analyzed by Northwest Methods NWTPH-Gx and -Dx for gasoline-range petroleum hydrocarbons and diesel and lube oil-range petroleum hydrocarbons respectively.

[6] Volatile organic compounds (VOCs; BTEX only) were analyzed by EPA Method 8021B.

[7] Metals analyzed by United States Environmental Protection Agency (EPA) 6000/7000 series method.

[8] Model Toxics Control Act (MTCA) Method A cleanup level for Trivalent Chromium.

[9] Naphthalenes were analyzed by EPA method 8270D/SIM.

[10] Total naphthalenes are the sum of 1-methylnaphthalene, 2-methylnaphthalene and naphthalene.

[11] Polycyclic aromatic hydrocarbons (PAHs) including carcinogenic PAHs (cPAHs) were analyzed by EPA method 8270D/SIM.

[12] Total Toxic Equivalent Concentration (TTEC) is the sum of each individual cPAH concentration multiplied by its corresponding Toxicity Equivalency Factor (TEF).

bgs = below ground surface

mg/kg = milligram per kilogram

U = Analyte was not detected at or greater than the listed laboratory reporting limit

-- = not analyzed

NE = cleanup level not established

MTCA = Model Toxics Control Act

BTEX = benzene, toluene, ethylbenzene and xylenes

cPAHs = carcinogenic polycyclic aromatic hydrocarbons

TEF = Toxic Equivalency Factor as defined in WAC 173-340-900 Table 708-2

Bold font type indicates that the analyte was detected at a level greater than the laboratory reporting limit

Table 2

Summary of Groundwater Chemical Analytical Data

Luther Burbank Park: Upland Improvements

Mercer Island, Washington

GeoEngineers Project # 0817-024-01

Investigation Name	Hart Crowser, 2002[1]		**MTCA Method A Cleanup Level (µg/L)**
Monitoring Well Identification	P-1	P-5	
Screen Interval (feet bgs)	0.3 to 5.3	1.5 to 6.5	
Sample Date	06/2002	06/2002	
Total Petroleum Hydrocarbons[2] (mg/kg)			
Diesel-range	200 U	200 U	500
Lube oil-range	500 U	500 U	500

Notes:

[1] Chemical analysis performed by ESN Northwest Laboratory of Olympia, Washington.

[2] Total petroleum hydrocarbons (TPH) were analyzed by Northwest Methods NWTPH-Gx and -Dx for gasoline-range petroleum hydrocarbons and diesel and lube oil range petroleum hydrocarbons respectively.

bgs = below ground surface

µg/L = micrograms per liter

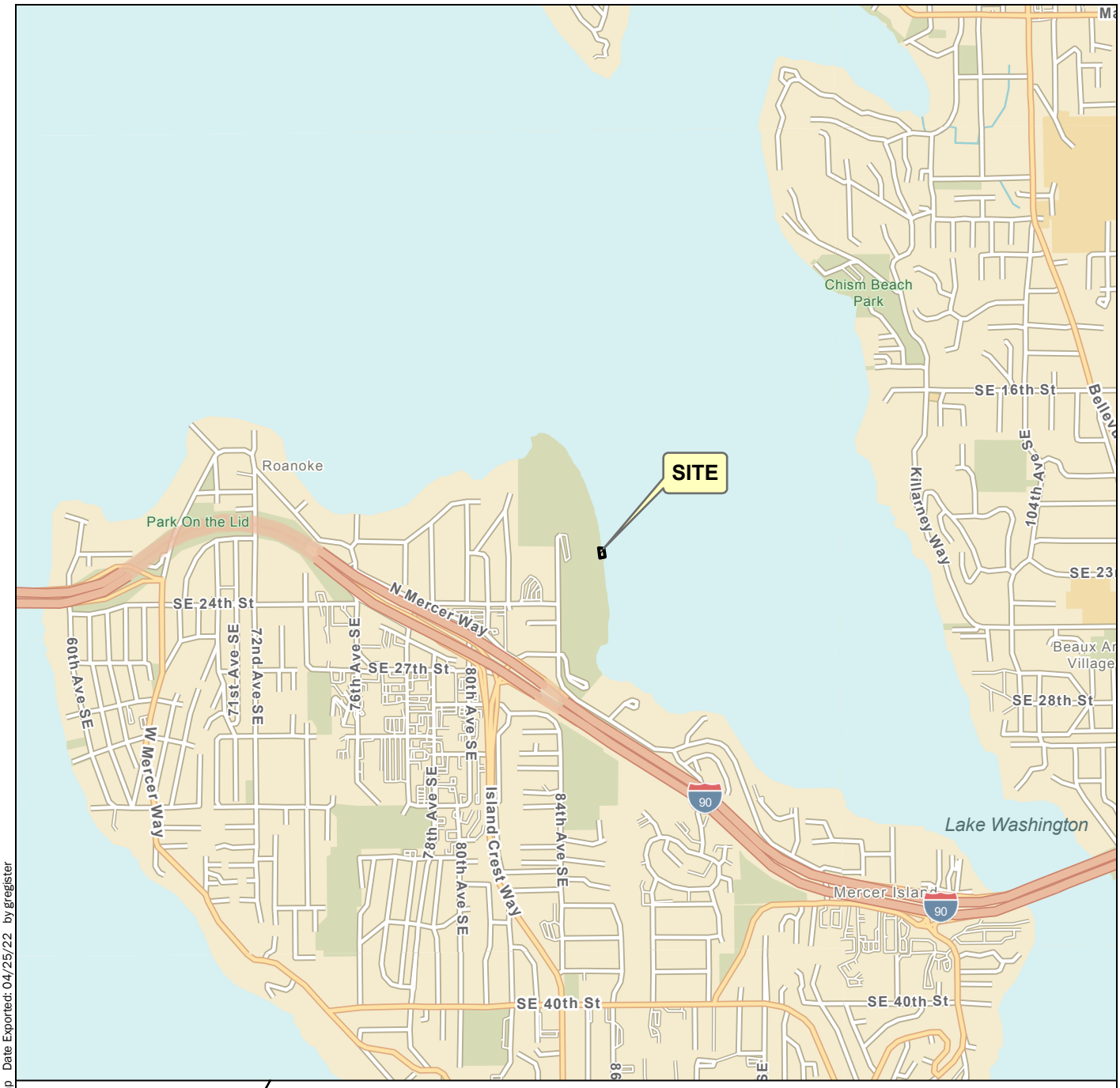
U = Analyte was not detected at or greater than the listed practical quantitative limit

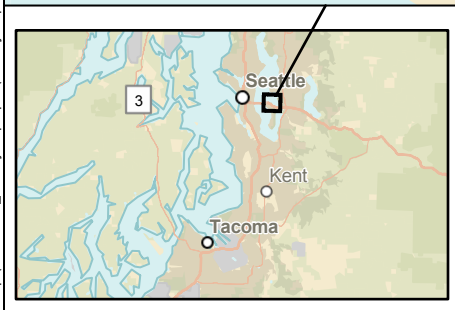
MTCA = Model Toxics Control Act

Bold font type indicates that the analyte was detected at a level greater than the laboratory reporting limit.

FIGURES

GeoEngineers





N
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2,000 0 2,000

Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 UTM Zone 10N

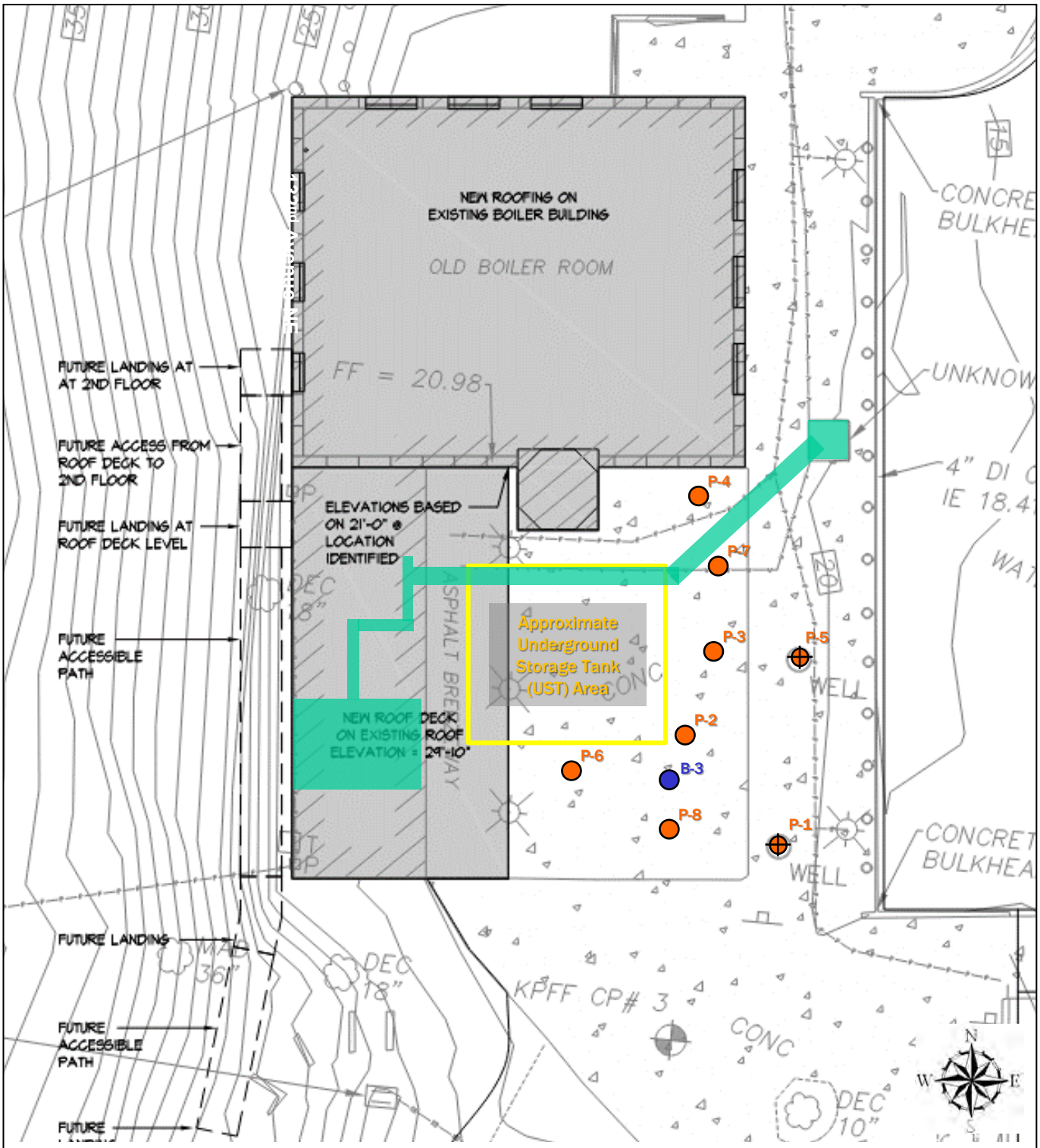
Vicinity Map

Luther Burbank Park Upland Improvements
Mercer Island Washington

GeoEngineers

Figure 1

P:\0\0817024\GIS\0817024_VicinityMap\0817024_VicinityMap.aprx\VicinityMap Date Exported: 04/25/22 by gregister



Legend

- Approximate Planned Excavation Extent
- B-3 Hollow-stem Auger Boring (GeoEngineers, 2022)
- P-4 Direct Push Boring (Hart Crowser, 2002)
- P-1 Monitoring Well (Hart Crowser, 2002)

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Source: Luther Burbank Park Boiler Building, LBB1 - 100% DD Plans dated August 12, 2022.

Site Plan

Luther Burbank Park Upland Improvements
Mercer Island, Washington

GeoEngineers

Figure 2

APPENDICES

GeoEngineers

APPENDIX A
Ecology Comment Letter on SEPA

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Region Office
PO Box 330316, Shoreline, WA 98133-9716 • 206-594-0000

December 15, 2022

Molly McGuire, Planner
Community Planning and Development
City of Mercer Island
9611 SE 36th St
Mercer Island, WA 98040

Re: City of Mercer Island Luther Burbank Park Waterfront Project
File# SEP22-019, Ecology SEPA# 202205693

Dear Molly McGuire:

Thank you for the opportunity to provide comments on the State Environmental Policy Act (SEPA) notice of application utilizing the optional determination of nonsignificance (ODNS/NOA) process for the City of Mercer Island Luther Burbank Park Waterfront Project. Based on review of the checklist associated with this project, the Department of Ecology (Ecology) has the following comments:

The project includes restoration of the existing Boiler Plant building. The Boiler Plant building is the location of past remedial actions related to releases from former underground storage tanks (CSID 4749, FSID 74911249). This cleanup action received a no further action determination from Ecology in 2003 for diesel-contaminated soil. Although not anticipated, any contaminated soil that is encountered during restoration activities around the Boiler Plant building should be reported to Ecology (Report a spill - Washington State Department of Ecology).

Thank you for considering these comments from Ecology. If you have any questions or would like to respond to these comments, please contact Kim Vik from the Toxics Cleanup Program at (206) 556-5258 or by email at kim.vik@ecy.wa.gov.

Sincerely,

Kelli Price

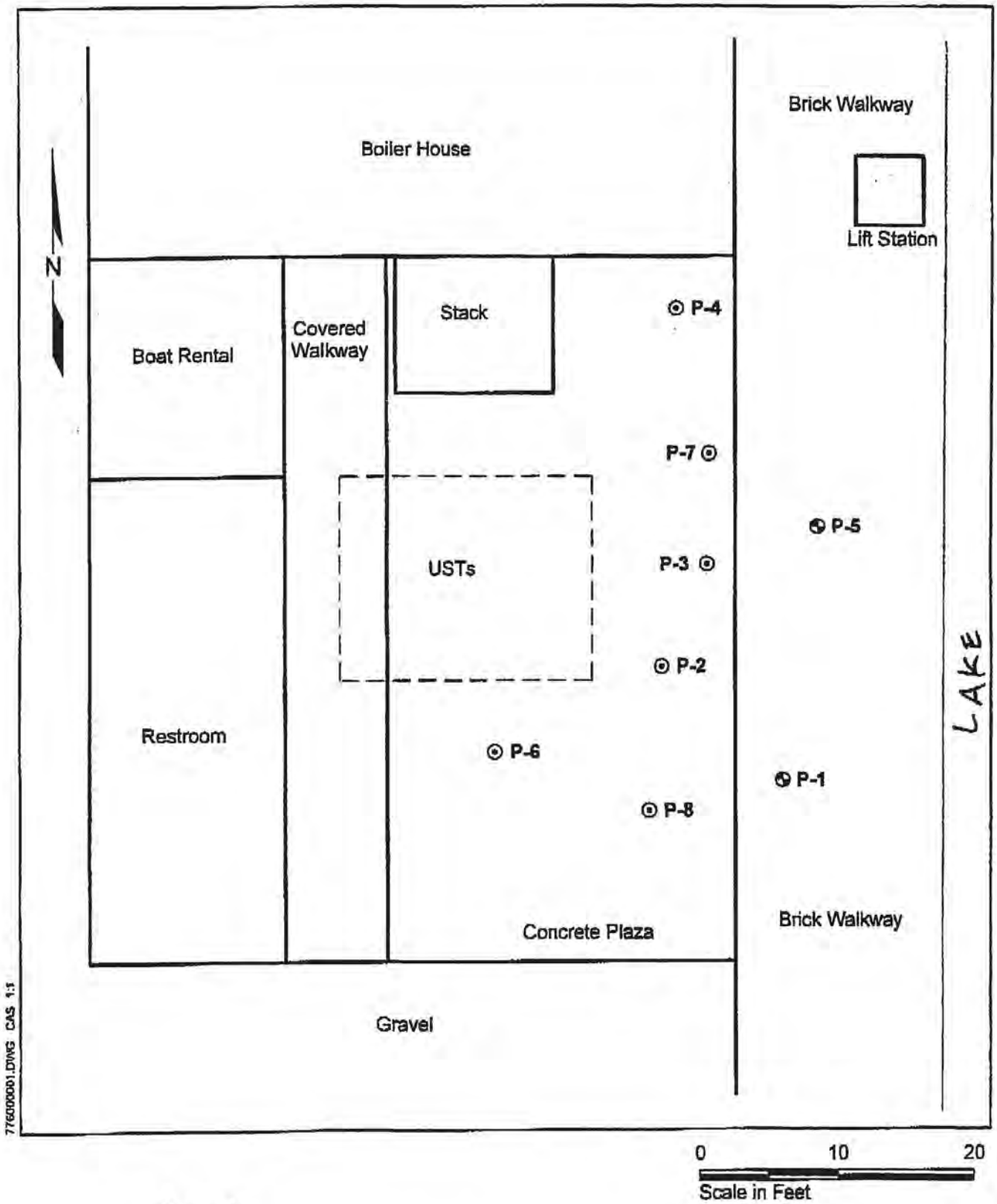
Kelli Price
SEPA Coordinator

Sent by email: Molly McGuire, molly.mcguire@mercerisland.gov

ecc: Paul West, City of Mercer Island
Kim Vik, Ecology

APPENDIX B
2002 Hart Crowser Report (Select Pages)

Site and Exploration Plan



Legend:

⊙ **P-8** Stratoprobe Boring Location and Number

⊕ **P-1** Monitoring Well Location and Number

P-1 & P-5 - Wells

HARTCROWSER

7760-00 6-02

Figure 1 June 2002

Table 1 - Stratoprobe Soil and Groundwater Chemical Analysis Summary

SOIL RESULTS

Sample ID Depth in Feet	MTCA Cleanup Levels	P-1 S-1 1.0 to 5.0	P-2 S-2 4.0 to 8.0	P-2 S-3 8.0 to 10.0	P-3 S-1 1.0 to 4.0	P-3 S-2 4.0 to 7.5	P-4 S-2a 4.0 to 5.0
Fuel Hydrocarbons in mg/kg	**Method A**						
NWTPH-Dx							
Diesel	2,000	20 U	20 U	42	750	20 U	610
Heavy Oils	2,000	50 U	50 U	50 U	460	50 U	50 U

Sample ID Depth in Feet	MTCA Cleanup Levels	P-5 S-2 4.0 to 8.0	P-6 S-2 4.0 to 8.0	P-7 S-1 1.0 to 4.0	P-8 S-1 1.0 to 4.0	P-8 S-2 4.0 to 8.0	
Fuel Hydrocarbons in mg/kg	**Method A**						
NWTPH-Dx							
Diesel	2,000	20 U	20 U	20	1,200	20 U	
Heavy Oils	2,000	50 U	50 U	50 U	290	50 U	

GROUNDWATER RESULTS

Sample ID Screen Interval in Feet	MTCA Cleanup Levels	P-1 0.3 to 5.3	P-5 1.5 to 6.5
Fuel Hydrocarbons in ug/L	**Method A**		
NWTPH-Dx			
Diesel	500	200 U	200 U
Heavy Oils	500	500 U	500 U

Notes:
U = Not detected at indicated detection limit.
Method NWTPH-D-extended analysis conducted by ESN Laboratory, Bellevue, WA.

APPENDIX C
Chemical Analytical Data

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

April 12, 2022

Sydney Bronson
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0817-024-01
Laboratory Reference No. 2204-014

Dear Sydney:

Enclosed are the analytical results and associated quality control data for samples submitted on April 1, 2022.

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

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

Case Narrative

Samples were collected on April 1, 2022 and received by the laboratory on April 1, 2022. 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.

Total Metals EPA 6010D/7471B Analysis

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

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.

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
B-3-2	04-014-01	Soil	4-1-22	4-1-22	
B-3-5	04-014-02	Soil	4-1-22	4-1-22	
B-3-10	04-014-04	Soil	4-1-22	4-1-22	
B-3-0-10	04-014-05	Soil	4-1-22	4-1-22	

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-2**					
Laboratory ID:	04-014-01					
Benzene	**ND**	0.020	EPA 8021B	4-5-22	4-5-22	
Toluene	**ND**	0.067	EPA 8021B	4-5-22	4-5-22	
Ethyl Benzene	**ND**	0.067	EPA 8021B	4-5-22	4-5-22	
m,p-Xylene	**ND**	0.067	EPA 8021B	4-5-22	4-5-22	
o-Xylene	**ND**	0.067	EPA 8021B	4-5-22	4-5-22	
Gasoline	**ND**	6.7	NWTPH-Gx	4-5-22	4-5-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*66-129*				
Client ID:	**B-3-5**					
Laboratory ID:	04-014-02					
Benzene	**ND**	0.020	EPA 8021B	4-5-22	4-5-22	
Toluene	**ND**	0.064	EPA 8021B	4-5-22	4-5-22	
Ethyl Benzene	**ND**	0.064	EPA 8021B	4-5-22	4-5-22	
m,p-Xylene	**ND**	0.064	EPA 8021B	4-5-22	4-5-22	
o-Xylene	**ND**	0.064	EPA 8021B	4-5-22	4-5-22	
Gasoline	**ND**	6.4	NWTPH-Gx	4-5-22	4-5-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*66-129*				
Client ID:	**B-3-10**					
Laboratory ID:	04-014-04					
Benzene	**ND**	0.020	EPA 8021B	4-5-22	4-5-22	
Toluene	**ND**	0.052	EPA 8021B	4-5-22	4-5-22	
Ethyl Benzene	**ND**	0.052	EPA 8021B	4-5-22	4-5-22	
m,p-Xylene	**ND**	0.052	EPA 8021B	4-5-22	4-5-22	
o-Xylene	**ND**	0.052	EPA 8021B	4-5-22	4-5-22	
Gasoline	**ND**	5.2	NWTPH-Gx	4-5-22	4-5-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*97*	*66-129*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-0-10**					
Laboratory ID:	04-014-05					
Benzene	**ND**	0.020	EPA 8021B	4-5-22	4-5-22	
Toluene	**ND**	0.053	EPA 8021B	4-5-22	4-5-22	
Ethyl Benzene	**ND**	0.053	EPA 8021B	4-5-22	4-5-22	
m,p-Xylene	**ND**	0.053	EPA 8021B	4-5-22	4-5-22	
o-Xylene	**ND**	0.053	EPA 8021B	4-5-22	4-5-22	
Gasoline	**ND**	5.3	NWTPH-Gx	4-5-22	4-5-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*66-129*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-2**					
Laboratory ID:	04-014-01					
Diesel Range Organics	**ND**	31	NWTPH-Dx	4-6-22	4-6-22	
Lube Oil Range Organics	**130**	63	NWTPH-Dx	4-6-22	4-6-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*108*	*50-150*				
Client ID:	**B-3-5**					
Laboratory ID:	04-014-02					
Diesel Range Organics	**ND**	30	NWTPH-Dx	4-6-22	4-6-22	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	4-6-22	4-6-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*113*	*50-150*				
Client ID:	**B-3-10**					
Laboratory ID:	04-014-04					
Diesel Fuel #2	**150**	29	NWTPH-Dx	4-6-22	4-6-22	
Lube Oil	**110**	58	NWTPH-Dx	4-6-22	4-6-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*116*	*50-150*				
Client ID:	**B-3-0-10**					
Laboratory ID:	04-014-05					
Diesel Range Organics	**ND**	29	NWTPH-Dx	4-6-22	4-6-22	
Lube Oil Range Organics	**ND**	58	NWTPH-Dx	4-6-22	4-6-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*98*	*50-150*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-2**					
Laboratory ID:	04-014-01					
Naphthalene	**0.011**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
2-Methylnaphthalene	**0.028**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
1-Methylnaphthalene	**0.010**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthylene	**0.014**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthene	**0.031**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Fluorene	**0.042**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Phenanthrene	**0.049**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Anthracene	**0.0096**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Fluoranthene	**0.053**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Pyrene	**0.065**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]anthracene	**0.025**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Chrysene	**0.026**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[b]fluoranthene	**0.026**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo(j,k)fluoranthene	**0.0086**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]pyrene	**0.026**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Indeno(1,2,3-c,d)pyrene	**0.018**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Dibenz[a,h]anthracene	**ND**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[g,h,i]perylene	**0.020**	0.0084	EPA 8270E/SIM	4-4-22	4-4-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*83*	*41 - 114*				
Pyrene-d10	*73*	*39 - 115*				
Terphenyl-d14	*85*	*44 - 125*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-5**					
Laboratory ID:	04-014-02					
Naphthalene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
2-Methylnaphthalene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
1-Methylnaphthalene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthylene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Fluorene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Phenanthrene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Anthracene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Fluoranthene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Pyrene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]anthracene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Chrysene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[b]fluoranthene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo(j,k)fluoranthene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]pyrene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Dibenz[a,h]anthracene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[g,h,i]perylene	**ND**	0.0079	EPA 8270E/SIM	4-4-22	4-4-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*79*	*41 - 114*				
Pyrene-d10	*69*	*39 - 115*				
Terphenyl-d14	*78*	*44 - 125*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-10**					
Laboratory ID:	04-014-04					
Naphthalene	**ND**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
2-Methylnaphthalene	**0.51**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
1-Methylnaphthalene	**0.55**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthylene	**0.021**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthene	**0.13**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Fluorene	**0.11**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Phenanthrene	**0.26**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Anthracene	**0.054**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Fluoranthene	**0.021**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Pyrene	**0.053**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]anthracene	**0.027**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Chrysene	**0.037**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[b]fluoranthene	**ND**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo(j,k)fluoranthene	**ND**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]pyrene	**0.011**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Dibenz[a,h]anthracene	**ND**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[g,h,i]perylene	**ND**	0.0078	EPA 8270E/SIM	4-4-22	4-4-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*85*	*41 - 114*				
Pyrene-d10	*74*	*39 - 115*				
Terphenyl-d14	*84*	*44 - 125*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-0-10**					
Laboratory ID:	04-014-05					
Naphthalene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
2-Methylnaphthalene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
1-Methylnaphthalene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthylene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Fluorene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Phenanthrene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Anthracene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Fluoranthene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Pyrene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]anthracene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Chrysene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[b]fluoranthene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo(j,k)fluoranthene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]pyrene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Dibenz[a,h]anthracene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[g,h,i]perylene	**ND**	0.0077	EPA 8270E/SIM	4-4-22	4-4-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*86*	*41 - 114*				
Pyrene-d10	*75*	*39 - 115*				
Terphenyl-d14	*87*	*44 - 125*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-2**					
Laboratory ID:	04-014-01					
Arsenic	**ND**	13	EPA 6010D	4-4-22	4-5-22	
Barium	**37**	3.1	EPA 6010D	4-4-22	4-5-22	
Cadmium	**ND**	0.63	EPA 6010D	4-4-22	4-5-22	
Chromium	**23**	0.63	EPA 6010D	4-4-22	4-5-22	
Lead	**12**	6.3	EPA 6010D	4-4-22	4-5-22	
Mercury	**ND**	0.31	EPA 7471B	4-5-22	4-5-22	
Selenium	**ND**	13	EPA 6010D	4-4-22	4-5-22	
Silver	**ND**	1.3	EPA 6010D	4-4-22	4-5-22	
Client ID:	**B-3-5**					
Laboratory ID:	04-014-02					
Arsenic	**ND**	12	EPA 6010D	4-4-22	4-5-22	
Barium	**56**	3.0	EPA 6010D	4-4-22	4-5-22	
Cadmium	**ND**	0.60	EPA 6010D	4-4-22	4-5-22	
Chromium	**34**	0.60	EPA 6010D	4-4-22	4-5-22	
Lead	**ND**	6.0	EPA 6010D	4-4-22	4-5-22	
Mercury	**ND**	0.30	EPA 7471B	4-5-22	4-5-22	
Selenium	**ND**	12	EPA 6010D	4-4-22	4-5-22	
Silver	**ND**	1.2	EPA 6010D	4-4-22	4-5-22	
Client ID:	**B-3-10**					
Laboratory ID:	04-014-04					
Arsenic	**ND**	12	EPA 6010D	4-4-22	4-5-22	
Barium	**73**	2.9	EPA 6010D	4-4-22	4-5-22	
Cadmium	**ND**	0.58	EPA 6010D	4-4-22	4-5-22	
Chromium	**35**	0.58	EPA 6010D	4-4-22	4-5-22	
Lead	**ND**	5.8	EPA 6010D	4-4-22	4-5-22	
Mercury	**ND**	0.29	EPA 7471B	4-5-22	4-5-22	
Selenium	**ND**	12	EPA 6010D	4-4-22	4-5-22	
Silver	**ND**	1.2	EPA 6010D	4-4-22	4-5-22	

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-0-10**					
Laboratory ID:	04-014-05					
Arsenic	**ND**	12	EPA 6010D	4-4-22	4-5-22	
Barium	**80**	2.9	EPA 6010D	4-4-22	4-5-22	
Cadmium	**ND**	0.58	EPA 6010D	4-4-22	4-5-22	
Chromium	**44**	0.58	EPA 6010D	4-4-22	4-5-22	
Lead	**ND**	5.8	EPA 6010D	4-4-22	4-5-22	
Mercury	**ND**	0.29	EPA 7471B	4-5-22	4-5-22	
Selenium	**ND**	12	EPA 6010D	4-4-22	4-5-22	
Silver	**ND**	1.2	EPA 6010D	4-4-22	4-5-22	

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0405S1					
Benzene	**ND**	0.020	EPA 8021B	4-5-22	4-5-22	
Toluene	**ND**	0.050	EPA 8021B	4-5-22	4-5-22	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-5-22	4-5-22	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-5-22	4-5-22	
o-Xylene	**ND**	0.050	EPA 8021B	4-5-22	4-5-22	
Gasoline	**ND**	5.0	NWTPH-Gx	4-5-22	4-5-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*66-129*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-357-02										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*83*	*88*	*66-129*			
SPIKE BLANKS											
Laboratory ID:	SB0405S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.809**	**0.829**	1.00	1.00		**81**	**83**	68-112	2	10	
Toluene	**0.858**	**0.878**	1.00	1.00		**86**	**88**	70-114	2	10	
Ethyl Benzene	**0.881**	**0.907**	1.00	1.00		**88**	**91**	70-115	3	10	
m,p-Xylene	**0.881**	**0.905**	1.00	1.00		**88**	**91**	69-117	3	11	
o-Xylene	**0.903**	**0.922**	1.00	1.00		**90**	**92**	71-115	2	11	
Surrogate:											
Fluorobenzene						*83*	*86*	*66-129*			

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0406S1					
Diesel Range Organics	**ND**	25	NWTPH-Dx	4-6-22	4-6-22	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	4-6-22	4-6-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*135*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	04-014-01									
	ORIG	DUP								
Diesel Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Lube Oil Range Organics	**101**	**89.2**	NA	NA		NA	NA	12	NA	
Surrogate:										
o-Terphenyl						*108* *116*	*50-150*			

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

PAHs EPA 8270E/SIM
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0404S1					
Naphthalene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
2-Methylnaphthalene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
1-Methylnaphthalene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthylene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Acenaphthene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Fluorene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Phenanthrene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Anthracene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Fluoranthene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Pyrene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]anthracene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Chrysene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[b]fluoranthene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo(j,k)fluoranthene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[a]pyrene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Dibenz[a,h]anthracene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Benzo[g,h,i]perylene	**ND**	0.0067	EPA 8270E/SIM	4-4-22	4-4-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*101*	*41 - 114*				
Pyrene-d10	*81*	*39 - 115*				
Terphenyl-d14	*93*	*44 - 125*				

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

PAHs EPA 8270E/SIM
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:	03-332-01										
	MS	MSD	MS	MSD		MS	MSD				
Naphthalene	**0.0775**	**0.0733**	0.0833	0.0833	ND	93	88	41 - 123	6	23	
Acenaphthylene	**0.0855**	**0.0821**	0.0833	0.0833	ND	103	99	45 - 124	4	20	
Acenaphthene	**0.0844**	**0.0804**	0.0833	0.0833	ND	101	97	46 - 122	5	23	
Fluorene	**0.0824**	**0.0780**	0.0833	0.0833	ND	99	94	45 - 128	5	27	
Phenanthrene	**0.0958**	**0.0899**	0.0833	0.0833	0.0265	83	76	38 - 133	6	33	
Anthracene	**0.0771**	**0.0735**	0.0833	0.0833	ND	93	88	49 - 127	5	21	
Fluoranthene	**0.105**	**0.100**	0.0833	0.0833	0.0508	65	59	45 - 130	5	29	
Pyrene	**0.103**	**0.0980**	0.0833	0.0833	0.0455	69	63	43 - 132	5	32	
Benzo[a]anthracene	**0.105**	**0.0992**	0.0833	0.0833	0.0292	91	84	49 - 139	6	27	
Chrysene	**0.0969**	**0.0904**	0.0833	0.0833	0.0295	81	73	47 - 127	7	28	
Benzo[b]fluoranthene	**0.0977**	**0.0907**	0.0833	0.0833	0.0378	72	64	46 - 129	7	31	
Benzo(j,k)fluoranthene	**0.0857**	**0.0819**	0.0833	0.0833	0.0115	89	85	46 - 128	5	25	
Benzo[a]pyrene	**0.0960**	**0.0903**	0.0833	0.0833	0.0298	79	73	47 - 134	6	27	
Indeno(1,2,3-c,d)pyrene	**0.0942**	**0.0883**	0.0833	0.0833	0.0224	86	79	42 - 133	6	25	
Dibenz[a,h]anthracene	**0.0845**	**0.0784**	0.0833	0.0833	ND	101	94	46 - 129	7	24	
Benzo[g,h,i]perylene	**0.0925**	**0.0877**	0.0833	0.0833	0.0221	85	79	44 - 129	5	27	
Surrogate:											
2-Fluorobiphenyl						*90*	*88*	*41 - 114*			
Pyrene-d10						*81*	*79*	*39 - 115*			
Terphenyl-d14						*94*	*90*	*44 - 125*			

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

TOTAL METALS
EPA 6010D/7471B
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0404SM1					
Arsenic	**ND**	10	EPA 6010D	4-4-22	4-5-22	
Barium	**ND**	2.5	EPA 6010D	4-4-22	4-5-22	
Cadmium	**ND**	0.50	EPA 6010D	4-4-22	4-5-22	
Chromium	**ND**	0.50	EPA 6010D	4-4-22	4-5-22	
Lead	**ND**	5.0	EPA 6010D	4-4-22	4-5-22	
Selenium	**ND**	10	EPA 6010D	4-4-22	4-5-22	
Silver	**ND**	1.0	EPA 6010D	4-4-22	4-5-22	
Laboratory ID:	MB0405S1					
Mercury	**ND**	0.25	EPA 7471B	4-5-22	4-5-22	

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	03-362-01									
	ORIG	DUP								
Arsenic	**ND**	**ND**	NA	NA		NA	NA	NA	20	
Barium	**6.35**	**4.39**	NA	NA		NA	NA	37	20	C
Cadmium	**ND**	**ND**	NA	NA		NA	NA	NA	20	
Chromium	**10.4**	**4.67**	NA	NA		NA	NA	76	20	K
Lead	**ND**	**ND**	NA	NA		NA	NA	NA	20	
Selenium	**ND**	**ND**	NA	NA		NA	NA	NA	20	
Silver	**ND**	**ND**	NA	NA		NA	NA	NA	20	
Laboratory ID:	04-014-01									
Mercury	**ND**	**ND**	NA	NA		NA	NA	NA	20	
MATRIX SPIKES										
Laboratory ID:	03-362-01									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	**96.5**	**89.8**	100	100	ND	**97**	**90**	75-125	7	20
Barium	**99.5**	**92.9**	100	100	6.35	**93**	**87**	75-125	7	20
Cadmium	**43.9**	**40.9**	50.0	50.0	ND	**88**	**82**	75-125	7	20
Chromium	**96.1**	**89.2**	100	100	10.4	**86**	**79**	75-125	7	20
Lead	**240**	**225**	250	250	ND	**96**	**90**	75-125	6	20
Selenium	**92.6**	**86.6**	100	100	ND	**93**	**87**	75-125	7	20
Silver	**22.8**	**21.6**	25.0	25.0	ND	**91**	**86**	75-125	5	20
Laboratory ID:	03-362-01									
Mercury	**0.555**	**0.539**	0.500	0.500	0.0615	**99**	**96**	80-120	3	20

Date of Report: April 12, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014
Project: 0817-024-01

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
B-3-2	04-014-01	**20**	4-4-22
B-3-5	04-014-02	**16**	4-4-22
B-3-10	04-014-04	**14**	4-4-22
B-3-0-10	04-014-05	**13**	4-4-22

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.

X2 - Sample extract treated with a 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.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

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

Chain of Custody

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

Company: GeoEngineers
Project Number: 0817-024-01
Project Name: Luther Burbank Park
Project Manager: Sydney Benson
Sampled by: Brett Landoe

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

Laboratory Number: 04-014

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 8260D	Halogenated Volatiles 8260D	EDB EPA 8011 (Waters Only)	Semivolatiles 8270E/SIM (with low-level PAHs)	PAHs 8270E/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270E/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A			Hold		% Moisture
1	B-3-2	4-1-22	10:15	Soil	2		X		X					X					X								10
2	B-3-5	4-1-22	10:20	Soil	2		X		X					X					X								1
3	B-3-7.5	4-1-22	10:31	Soil	2																				X		
4	B-3-10	4-1-22	10:35	Soil	2		X		X					X					X								10
5	B-3-0-10	4-1-22	10:40	Soil	2		X		X					X					X								1

	Signature	Company	Date	Time
Relinquished		GeoEngineers	4-1-22	4:40
Received		ALPHA	4-1-22	4:40
Relinquished		ALPHA	4-1-22	5:42
Received		ORE	4/1/22	1742
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

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

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

April 27, 2022

Sydney Bronson
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0817-024-01
Laboratory Reference No. 2204-014B

Dear Sydney:

Enclosed are the analytical results and associated quality control data for samples submitted on April 1, 2022.

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

Date of Report: April 27, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014B
Project: 0817-024-01

Case Narrative

Samples were collected on April 1, 2022 and received by the laboratory on April 1, 2022. 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.

Date of Report: April 27, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014B
Project: 0817-024-01

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
B-3-0-10	04-014-05	Soil	4-1-22	4-1-22	

Date of Report: April 27, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014B
Project: 0817-024-01

SOLUBLE HEXAVALENT CHROMIUM
WATER EXTRACTION
EPA 7196A

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-3-0-10**					
Laboratory ID:	04-014-05					
Hexavalent Chromium	**ND**	1.2	EPA 7196A mod.	4-27-22	4-27-22	

Date of Report: April 27, 2022
Samples Submitted: April 1, 2022
Laboratory Reference: 2204-014B
Project: 0817-024-01

SOLUBLE HEXAVALENT CHROMIUM
WATER EXTRACTION
EPA 7196A
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0427S3					
Hexavalent Chromium	**ND**	1.0	EPA 7196A mod.	4-27-22	4-27-22	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-173-01										
	ORIG	DUP									
Hexavalent Chromium	**ND**	**ND**	NA		NA	NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	04-173-01										
	MS	MSD	MS	MSD		MS	MSD				
Hexavalent Chromium	**4.99**	**5.61**	5.00	5.00	ND	100	112	75-125	12	20	
SPIKE BLANK											
Laboratory ID:	SB0427S3										
	SB		SB			SB					
Hexavalent Chromium	**4.91**		5.00		NA	98		75-125	NA	NA	

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.

X2 - Sample extract treated with a 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.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

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

Chain of Custody

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Analytical Laboratory Testing Services
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Company: GeoEngineers
Project Number: 0817-024-01
Project Name: Luther Burbank Park
Project Manager: Sydney Benson
Sampled by: Brett Landoe

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

Laboratory Number: 04-014

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 8260D	Halogenated Volatiles 8260D	EDB EPA 8011 (Waters Only)	Semivolatiles 8270E/SIM (with low-level PAHs)	PAHs 8270E/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270E/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	HEXCHROME		Hold		% Moisture
1	B-3-2	4-1-22	10:15	Soil	2		X		X					X					X								10
2	B-3-5	4-1-22	10:20	Soil	2		X		X					X					X								1
3	B-3-7.5	4-1-22	10:31	Soil	2																				X		
4	B-3-10	4-1-22	10:35	Soil	2		X		X					X					X								10
5	B-3-0-10	4-1-22	10:40	Soil	2		X		X					X					X				(X)				1

	Signature	Company	Date	Time
Relinquished		GeoEngineers	4-1-22	4:40
Received		ALPHA	4-1-22	4:40
Relinquished		ALPHA	4-1-22	5:42
Received		ORE	4/1/22	1742
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
(X) Added 4/26/22. DB

Data Package: Standard ☐ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

APPENDIX D
Potentially Contaminant Impacted Soil Notification Form

POTENTIALLY CONTAMINANT IMPACTED SOIL NOTIFICATION FORM

Prepared for: City of Mercer Island Public Works 9601 SE 36th Street Mercer Island, Washington 98040	**GENERAL INFORMATION**	
	DATE OF DISCOVERY:	TIME OF DISCOVERY:
	PERSON DISCOVERING CONDITION:	PHONE NUMBER:
Prepared by: GeoEngineers 2101 4th Avenue, Suite 950 Seattle, Washington 98121 206.728.2674	PERSON FILLING OUT FORM:	PHONE NUMBER:
	APPROXIMATE LOCATION OF SOIL ON THE SITE:	

SOIL CHARACTERISTICS

PHYSICAL CHARACTERISTICS:

Odor:
- ☐ Yes (Describe_____)
- ☐ No

Staining:
- ☐ Yes (Describe_____)
- ☐ No

Other: _____

_____

SOIL DISTURBED:
- ☐ Soil in-place
- ☐ Soil stockpiled

FREE LIQUIDS:
- ☐ Yes (Content_____%)
- ☐ No

ACTIONS TAKEN: _____

_____

_____

_____

_____

ESTIMATED VOLUME OF CONTAMINATED SOIL:

NOTIFICATION CONTACT INFORMATION

City of Mercer Island	GEOENGINEERS	GEOENGINEERS
Paul West	Sydney Bronson	Tim Syverson
D: 206.677.1028	D: 425.861.6086	D: 206.448.4197
C: 206.275.7833	C: 509.951.9058	C: 206.605.9236
cherylc@mithun.com	sbronson@geoengineers.com	tsyverson@geoengineers.com

ADDITIONAL INFORMATION

This record serves to document information, actions, and notifications regarding the discovery of and response to the presence of suspected and known contamination on the project.

APPENDIX E
Report Limitations and Guidelines for Use

APPENDIX E
REPORT LIMITATIONS AND GUIDELINES FOR USE[3]

This Appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of City of Mercer Island Public Works and their authorized agents and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except City of Mercer Island Public Works and their authorized agents should rely on this plan without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report Is Based on a Unique Set of Project-Specific Factors

This report applies to the Luther Burbank Park project site in Mercer Island, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

If important changes are made after the date of this remedial action plan, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[3] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

Reliance Conditions for Third Parties

No third party may rely on the product of our services unless GeoEngineers agrees in advance, and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Environmental Regulations Are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Uncertainty May Remain after Completion of Remedial Activities

Remediation activity completed in a portion of a site cannot wholly eliminate uncertainty regarding the potential for contamination in connection with a property. Our interpretation of subsurface conditions in this study is based on field observations and chemical analytical data from widely spaced sampling locations. It is always possible that contamination exists in areas that were not explored, sampled or analyzed.

Subsurface Conditions Can Change

This environmental report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject site to another location or its reuse on site in instances that we were not aware of or could not control.

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical, Geologic and Geoenvironmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If the client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

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